COMPUTERWORLD

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HIS 6000 Series Features Instruction Set for Business

By Frank Piasta
CW Staff Writer

NEW YORK – Honeywell Information Systems (HIS) strengthened its large-scale computer line by adding a six-model 6000 series with new business-processing capabilities. The new series is an outgrowth of the GE 600 line.

Designed to compete with the IBM 370s as well as the Univac 1100 series, the new RCA line and the Burroughs B7000, the 6000 series is exceeded in power at its top end by very few currently available systems.

The new systems offer the 600 user full hardware and software compatibility at a better price/performance ratio, HIS said. Several new peripherals, including disk drives, tape drives, CRTs, and a new Datanet 30S front-end processor, have also been added. One disk unit comes in models for either GE or Honeywell systems, indicating efforts toward HIS intersystem compatibility.

The software system, Gecos III, is designed for users operating in multiprogramming, multiprocessing and time-sharing environments. The system has previously been used on GE 600 CPUs. A strong communications capability is also included.

The four largest models, the 6050, 6060, 6070 and 6080 include multiprocessor systems with up to four CPUs, two systems controllers each handling four memory modules, four I/O multiplexers and up to two communications processors.

The 6000 series can be divided into two groups. The 6040, 6060 and 6080 incorporate an Extended Instruction Set (EIS) that adapts the systems to a business-oriented environment.

The EIS consists of more than 100 hardwired macro instructions that can handle BCD, Ascii, packed decimal and bit string data formats. Operations such as multiply, divide and compare are possible, as are mixed mode operations.

HIS claims that the EIS capability decreases the core requirements of a typical business program by 30% while increasing the execution speed by a factor of at least three.

In the second group, the 6030, 6050 and 6070 are lower-priced systems, identical to the even-numbered models except for the lack of EIS. They are intended for a mixed scientific/engineering and business work load, HIS said.

The 6000 series features an Input Output Multiplexer (IOM) module designed to coordinate all I/O operations between peripherals and memory.

It also permits high throughput and simultaneous channel operation.

The IOM controls all I/O functions over eight to 24 simultaneous data channels with rates of up to 6 million char/sec.

In addition to the Datanet 30 and 355 that were previously offered with the 600 series, the 6000 can be equipped with the new Datanet 30S, designed for relatively small communications networks. It can handle up to two medium-speed and/or 12 low-speed communications lines, HIS said.

Limited Compatibility

While compatibility with the existing 600 series is maintained

(Continued on Page 4)

The HIS 6080 system can serve both business and engineering applications with a rental range that starts at $60,000/mo. The system is the largest of the 6000 series and is comparable to the IBM 370/165 in processing power.

Mixed System Cuts 360/30 Site Cost

By E. Drake Lundell Jr.
CW Computer Industry Editor

Could you use an extra $16,800 a year for your DP budget?

A look into a typical IBM 360/30 installation shows savings of at least that much are available if the peripheral equipment is replaced by independent devices.

With such an "independent" configuration, however, maintenance problems might crop up, so CW also figured in the cost of maintaining the system using an independent maintenance firm and that adds $1,000 to the savings.

The frugal user can save almost

Spotlight On User's Lib

$1,400/mo off the IBM price by replacing his present peripherals with independents – and that amounts to $16,800 per year.

IBM also has extra shift charges on all of its controllers – basically a 10% override but figured by the hour.

(IBM also charges overtime for some of its other equipment, but the controllers for the system were chosen for purposes of illustration.)

Therefore, if an installation operates on two shifts per day the user would be paying at least $52.50 extra a month or $630/yr just on controllers.

The three-shift user would pay a minimum of $105/mo extra or $1,260/yr. And that doesn't count weekend work.

In addition, IBM requires several mandatory options with much of its equipment. Consider the 1403 printer.

With the IBM unit you *have* to rent an interchangeable train cartridge which costs $97/mo ($1,154/yr) while it comes free with the comparable Telex unit.

If you want a universal character set, it will cost $15/mo and you will need another adapter that goes for $73/mo. They are included in the Telex rental.

And the list could go on and on. IBM lists around 20-25 options that are available with the unit – all at extra monthly rentals and all often offered for the base price by the independents.

User Alternatives

If the user is worried about maintenance for the system, he could probably hire his own systems engineer out of the savings, but there is another alternative – third-party maintenance.

The IBM maintenance charges for the system outlined here would run approximately $1,000/mo. Comma Corp., an independent leasing firm, claims that it beats the IBM price by 10%, which would run $100/mo or another $1,200/yr in savings.

Comma also says that it doesn't care whether the configuration is completely IBM or a mixed system, and indicated that in some cases maintenance

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Benefits Recomputed

DP Smiles on SS Recipients

By Thomas J. Morton
and Edward J. Bride
CW Staff Writers

BALTIMORE, Md – A computerized recomputation of more than two million Social Security recipients' earnings yielded an increase of from $5 to $25 in monthly benefit checks last year.

And millions of recipients will soon be getting increases in benefits in retirement or disability checks. Many aren't aware of the possible windfall, since they apparently don't know the complicated formulae used to determine their benefits.

Computerized audits are now performed annually, however, under a 1965 law enacting the Automatic Earnings Recomputation Operation (Aero), implemented on computers at Social Security headquarters here.

In one case, a blind man received a lump sum of more than $7,000, representing 14 years of accumulated disability benefits which were refigured and audited by a "routine" computer program.

The disabled man, Cecil A. Hall, a 68-year-old former painter, is typical of the many recipients unaware of one or both of two important facts:

- They could sometimes apply for a recomputation of their benefits, which are based on previous earnings, any disability, age, and other factors.
- A computer is now performing all these recomputations automatically.

Aside from the annual recomputation of a recipient's earnings (and therefore his benefits), Aero reviews new information, such as new earnings after a person becomes eligible for assistance because of age or disability.

Social Security benefits are currently based on maximum earnings of $7,800, no matter how much is actually earned. If a person already on the benefit rolls should earn more than $7,800 in one year, he would first lose his benefits for that year. But his future benefits would probably be increased as a result of that year's high income, which would replace the lowest reported income in the benefit formula, an official explained.

By the time all credited earning years are $7,800 or more, the ceiling will probably be increased again, the official predicted. There is already a proposal before Congress which, if enacted, would increase the basis for Social Security benefits to $9,000.

Since this formula was not known or understood by many recipients, and since it is constantly being changed by Congress, those who suspected they should have increases often didn't bother to apply. Now, they don't have to, since benefits are recomputed automatically.

Hall's lump sum payment was a retroactive

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News Service Available

NEWTONVILLE, Mass. — Beginning next week CW will offer a news digesting service, culling articles of special interest to subscribers from the 150 publications covering the computer industry.

Called Computa-Data, the service provides subscribers 30 categories from which to choose their digests. The CW computer system chooses articles of relevance to the interest areas for each subscriber to digest monthly. The articles selected are printed by the computer, bound and indexed.

Each monthly report is cross-referenced and source-documented as well.

Operated in conjunction with International Systems Design of Fort Lee, N.J., Computa-Data is designed to aid computer professionals to keep abreast of the deluge of information printed about the industry each month.

Fee for the service is $100 a year; a three-month trial subscription is available for $25.

So far plans call for making available digests of articles published since the beginning of the year.

Antitrust Action Charges Honeywell

By Thomas J. Morton
CW Midwest Bureau

CHICAGO — Elektra Industries and its subsidiary, Timeshare Network Corp., have filed a $7.1 million antitrust suit naming Honeywell, Inc. and National Computer Franchise Corp. as co-defendants.

The complaint was filed here in the U.S. District Court for the Northern District of Illinois, Eastern Division, and includes four counts.

The plaintiffs ask, under the Clayton and Sherman Acts, to determine that there has been, in fact, a conspiracy on the part of the two defendants to restrain trade and establish monopolization.

The plaintiffs are described in the complaint as being engaged in the solicitation of sales of comprehensive EDP services.

According to the complaint, Timeshare became National's first franchise to operate a DP service here. Timeshare accepted an H1648 time-sharing system from National, under the terms of the contract.

After making two payments to National under the contract, Timeshare requested the cancellation of the agreement due to an alleged failure on National's part to provide adequate service.

National demanded the return of the H1648 as a condition for the mutual cancellation.

While negotiations for cancellation were taking place, the complaint states, Timeshare and Elektra approached Honeywell to lease an H1648 directly.

The action states that on Oct. 9, 1969, Honeywell agreed to deliver its H1648 to the plaintiffs within 10 to 14 days.

Count one of the action states that National, aware that the plaintiffs were engaging in competitive activities, requested that Honeywell not deliver the system ordered by the plaintiffs, Elektra and Timeshare.

Honeywell, it is alleged, did not deliver the initial components of the system until December 1969, and withheld delivery and installation of the final components, and delayed the debugging of the system until February 1970.

The second count alleges that Honeywell and National, aware of Timeshare's inability to function, actively solicited the plaintiff's customers and prospects.

Count three of the action says that National induced Honeywell into a breach of contract with Timeshare and Elektra, while count four alleges that the breach of contract, in fact, took place.

While not specifically stating an amount, Elektra and Timeshare declare their losses, on each count, to be in excess of $850,000.

With the damages and punitive actions on all four counts, the suit is asking for $7.1 million, plus attorneys' fees and court costs.

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Components	IBM	Price/Mo ($) Independent
32K core memory CPU	2,670	2,670
2540 card/reader/punch	660	660
2821 control unit	970	1,750* (both)
1403 printer	875	
4 2401 Model 2 tape drives	1,940	1,400+
1 2803 controller	650	400†
4 2311 disk drives	2,280	1,800
2841 controller	525	525
1052 console printer	63	63
1051 control unit	73	73
Total	10,706	9,341

*Telex 1403-compatible printer & control; +Potter 2402 tape drive; †Potter TC 5803 controller; ◇Potter 4311.

Typical 360/30 Configuration

User Can Save on 360/30

(Continued from Page 1)

on the mixed system might be even cheaper than the normal 10% off.

Since the user turning to the independents can save money, the price/performance ratio of his equipment is similarly improved. He may even find that by using the independent equipment, the price/performance ratio of his third-generation equipment approaches that of the new "evolutionary" generation being announced by IBM.

Government, Industry

Japanese Team Up for DP Goal

By Bernice Pantell
Special to Computerworld

TOKYO — No other nation in the world is as organized as Japan to focus the strength, intelligence and experience of its computer community on the continuing development of information processing as an industry and as a social phenomenon. The role of the DP institutions in Japan in bringing this situation about is unique and they represent a powerful tool for progress

In the Japanese view, society in the future will be "informationalized," not as a natural development but through the deliberate efforts of the information industry and the government working in concert. They see this as a regional as well as a national effort.

Group Fellowship

At the end of 1970, the Asian Productivity Organization (APO) sponsored a group fellowship on the effective use of computers in Japan. Seven countries of the 14-member organization sent DP specialists to a six-week seminar in Japan. They came from Iran, Taiwan, Hong Kong, the Philippines, India, Pakistan and Vietnam.

During the six-week period, these specialists visited organizations and saw the computer installations of 23 users including banking, industry, trading, chemical companies, the National Railway and the National Police. They also visited three service bureau and software houses and several DP institutions.

These DP (or information) institutions are the truly revolutionary contribution to computer science in Japan. There are at least nine of them in existence today, both public and private. The Institute of Information Technology (IIT) was founded in March 1970 by the Ministry of International Trade and Industry, and though less than a year old, taught six classes in 1970 and has 14 classes scheduled for 1971.

It has an endowment of over $5 million in addition to student fees that will be derived from some 350 to 400 local and foreign students during the year.

IIT trains senior systems engineers, managers and instructors and conducts research on training for the information industry throughout the world and applies the results in its own courses.

Most significantly, it conducts research and publishes thoughtful studies on the role of information processing in society. IIT has its own computers, classrooms and workshops in the World Trade Center in downtown Tokyo.

The Fujitsu Information Processing Systems Laboratory is a private institution whose goal is to increase the use of computers in business and the understanding of information processing in society (using IIT studies on this subject). The Laboratory has 22 computers and terminals installed and conducts classes both day and night. The institution's classes for the general public run for six months. They provide a base for public support of the information industry throughout the population. For professionals, the institution runs one- and two-week courses on special subjects and has a full two-year course to graduate computer specialists from the evening school.

The Japan Electronic Computer Co. (Jecc) is a nonprofit organization that encourages the manufacture of computers in Japan and compiles and produces statistical data useful to government and industry.

The figures chart production trends and contribute the data necessary to set and fulfill information processing goals in Japan.

In 1968 a report from another public DP institution (the Committee on Information Processing and Information Industry) found Japan seriously lagging behind the computerized nations of the world. It observed that Japan had 3,500 computers installed, compared to 4,100 in West Germany and 40,000 in the U.S. Two years later, statistics showed Japan with 6,700 computers, Germany with 6,600 and the U.S. with 47,000.

One of the committee's recommendations was the education of school children in the use of computers. Less than two years later, 43,000 Canon 164-P devices were installed in the nation's high schools, training students in computer science. The goal is to make the general public of the future as familiar with computers as the current population is with the abacus.

Jecc enables both government and industry in Japan to know where they stand and decide where they are going.

Automatic Recomputation Increases Social Security Benefits for Many

(Continued from Page 1)

increase, going back 14 years when he accidentally shot himself while cleaning a rifle. A Social Security spokesman said "live earnings figures" were not used to compute Hall's benefits, meaning his benefits were not based on the most recent annual income. This disability phase of Aero is a recent addition to the program, the official noted in explaining why the particular inequity had not been discovered sooner.

Above and Beyond . . .

The disability phase actually goes further than the law originally intended, according to headquarters staff. "We knew everybody wasn't getting everything," an official noted. It was also obvious the millions of recipients did not know there was such a process as recomputation.

The Senate Finance Committee in 1965, apparently at the urging of the Social Security Administration, enacted Aero because of the "improved electronic equipment that is now used to compute benefit amounts," a Senate report stressed.

The report stated it would be "both feasible and administratively advantageous" to computerize the recomputations.

A Social Security official emphasized there had not been many requests, because many people didn't understand the possibility of recomputation.

"Computers made it possible," the spokesman said, of both the Hall windfall and the increased checks to two million.

Ervin Probe

U.S. Passport Office Maintains Inclusive Data Bank

WASHINGTON, D.C. – The U.S. Passport Office has a computer data bank of 243,135 people whose application for a passport may be of interest to it or to law enforcement agencies.

Persons listed in the file are probably unaware of its existence, and a Passport Office spokesman refused to say whether a person could find out if he was listed.

The spokesman did say, however, that other government agencies can both look at the file and add to it.

The existence of the data bank was uncovered as part of Sen. Sam J. Ervin's (D-N.C.) continuing investigation of government data banks. He sent questionnaires to more government agencies and the report on the passport data bank was included in the State Department reply.

'Subversives'

According to the State Department, the largest group of names in the data bank is "known or suspected Communists or subversives" and the second largest group is persons of "doubtful citizenship."

In an interview with the *New York Times*, Passport Office Director Frances Knight denied this and said that the "vast majority" of those listed fell into the "doubtful citizenship" category.

Others in the data bank include:

- Individuals whose "actions do not reflect to the credit of the U.S. abroad."
- Persons wanted by law enforcement agencies.
- Defectors, expatriates, etc.
- Delinquents or suspected delinquents in military service.

In the *Times* interview, Miss Knight said that she would not necessarily notify a person that he was included in the file even if he was denied a passport.

When a person applies for a passport, the local passport office sends a teletypewriter message to Washington to check whether a person is in the file. If he is in the file because a law enforcement agency requested that he be listed, that agency is informed.

The Passport Office spokesman was unable to give details of the computer system.

Hearing to Scrutinize Practices, Extent of U.S., Army Surveillance

WASHINGTON – "Instant blacklisting, rapid cross country exchange of dossiers, million name master indexes, and scientific surveillance can easily become the order of the political day in this era of systems analysis," warned Sen. Sam J. Ervin (D-N.C.) in announcing the schedule for hearings he will conduct on "Computers, Data Banks, and the Bill of Rights."

The hearings by the Subcommittee on Constitutional Rights, rescheduled from November, open this week and will continue through March 11. Primary focus of the hearings will be the Army's data banks, with Department of Defense officials testifying for three days next week.

But Ervin also plans to investigate a wide range of Justice Department data banks and the Department of Transportation's computer data bank of everyone who has ever had his driver's license denied, revoked, suspended, or withdrawn.

Five computer experts will testify: Robert Henderson, vice-president Honeywell Information Systems (March 3); Caxton Foster, professor of computer science at the University of Massachusetts (March 10); Robert Bigelow, lawyer and chairman of the ACM Special Interest Committee on Computers and Society (March 10); Arthur Miller, University of Michigan law professor and author of "Assault on Privacy" (Feb. 23); and a representative of IBM (Feb. 23).

According to Ervin, the Subcommittee on Constitutional Rights hopes to learn:

- What government data banks are now in operation,
- How many are computerized.
- What constitutional rights are affected.
- What legislative controls are needed.

"It has become increasingly clear that unless we take command now of the new technology with all that it means. . .for the individual who is computerized,we may well someday discover that the machine stands above the law," Ervin warned.

"By then," he added, "it will make no difference who mans the systems or what political party makes use of them, the pattern of mechanized surveillance will have become institutionalized.

"We have known political blacklisting before," commented Ervin, "but the efficiency with which it is now done" makes it a much more serious problem.

Review Continues In School Closings

CW Midwest Bureau

AKRON, Ohio – One grand jury investigating the closing of Computer Tabulating Institutes (CTI) here and in other Ohio cities which left some 200 former students stranded and deeply in debt [CW, Jan. 20] has rendered its final reports without returning any indictments.

In Summit County, the new county prosecutor, Robert Mohler, has promised to carry on the investigation begun by his predecessor, James Barbuto, now a common pleas court judge, at "full steam."

CTI schools in Akron, Toledo and Dover, Ohio, closed their doors without notice late last year, stranding over 200 students with uncancellable loans to three Cleveland finance companies and a Canton bank.

All of the finance companies are suing the owner of the closed CTI schools, 24 year-old Stuart Lowe of Cleveland.

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HIS Has Dual-System Disk Drive

By Frank Piasta
CW Staff Writer

NEW YORK – The first disk drive that can be used with both Honeywell and GE systems is among the equipment announced with the HIS 6000 series of computers.

Other new peripherals for the 6000 series include a medium-capacity disk drive using a 2316-type pack, three CRTs and two tape units.

The dual-system disk drive can be used with the Honeywell 2015, 3200, 4200 and 8200 as the Type 279. When used with the GE 6000 series it is called the DSS190. Both share hardware and operating characteristics.

The basic disk unit was developed in Phoenix, after which separate interfaces were engineered for the 6000 series and the 2015, an HIS spokesman told CW.

The versions differ in requiring separate data controllers, however. They also vary in maximum storage capacities and data formats.

The 279/DSS190 uses the Honeywell M4050 disk pack that has twelve 14-in. disks mounted on a single spindle to provide 19 data recording surfaces. Each pack can store 133 million characters. The device is similar to the new IBM 3330 disk unit.

Average seek time is 30 msec, and the pack rotates at 3,600 rpm with an average latency of 8.3 msec Data transter is 1.074 M char/sec.

The basic DSS190 has two disk pack drives to store 266 M characters. This can be expanded in increments of one drive to a total of 16 drives and 2.128 billion characters.

The Type 279 is expandable from the basic two drives to a maximum of eight drives and 1,064 characters on-line.

The two drive system carries a one-year lease price of $3,700/mo or can be purchased for $162,800. Additional drives cost $650/mo or $28,600. First deliveries are scheduled for the third quarter of 1972.

Medium Disk

The medium-size disk pack system, the DSS180, has a 34 msec average access time and a transfer rate of 416,000 char/sec. It uses GE DCT 170 or Honeywell M4008 packs.

First deliveries will begin in July. The basic three-drive system stores 83 M characters and leases for $2,300/mo. Purchase price is $101,200. Each additional drive, with a capacity of 27.5 M characters, will lease for $470/mo and sell for $20,680.

Three CRTs

The three new CRTs, the 765, 775, and 785 may be used on any series 200, 400, 600 or 6000 computer system. The 775 and 785 may also be used with a printer to provide hard copy of displayed information.

The Type 765 CRT Terminal has a 14-in. screen and alphanumeric keyboard. The screen capacity is 1,012 characters (22 by 46).

Deliveries of the 785 will begin next October. The three-year lease price is $215/mo, and the purchase price is $7,740.

Tape Systems

The MTH 502 and MTH 505 mag tape units process data on half-inch tape using nine channels. Data can be recorded at 800 or 1,600 bit/in.

The MTH 502 has a tape speed of 75 in./sec and a rewind speed of 500 in./sec. The transfer rate is 80,000 or 160,000 char/sec.

The MTH 505 has a transport speed of 125 in./sec and data rates of 133,000 or 266,000 char/sec.

On a three-year lease, the Type 765 will cost $175/mo, or can be purchased for $6,300. First deliveries are scheduled for June.

The 775 is similar except that data is transmitted at 2,000 or 2,400 bit/sec in a synchronous mode. The three-year lease costs $200/mo and the purchase price is $7,200. Deliveries will begin in July.

The MTH 502 will lease for $465/mo and sell for $20,460. The MTH 505 has a lease price of $585/mo and a purchase price of $25,740.

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600 User Gets Software, Hardware Compatibility

(Continued from Page 1)

in that software and most peripherals can be used with the newer system, HIS had made very few provisions for the users of other systems. Aids to conversion from an IBM 360 to the 6000 are limited to information exchange media and data translation aids, a spokesman told CW.

The models 6030 and 6040 are offered in memory sizes from 64K to 128K 36-bit words. Cycle time is 1.2 μsec/2 words, with I/O Multiplexer throughput at 1.3 million char/sec for each IOM.

A typical 6030 batch system will lease for $23,410/mo and sell for $1,040,690. It consists of a 96K word processor, systems controller, 8-channel IOM, 1,100 line/min printer, six mag tape drives, card reader, card punch, console, and 166-million characters of disk storage. A similar 6040 will sell for $1,100,890 and lease for $24,710/mo.

The models 6050 and 6060 operate at two to four times faster than the smaller models due to the availability of two-way and four-way memory interleaving and instruction overlap. Cycle time is the same as the 6030/6040 with memory sizes ranging from 96K to 256K. I/O Multiplexer throughput is 3.7 million char/sec for each IOM.

A typical 6050 batch system will lease for $44,300/mo and sell for $1,966,660. This system includes 192K of memory, 12 mag tape drives, two 1,100 line/min printers, card reader, card punch, console, and 798 million characters of disk storage. A similar 6060 leases for $45,800/mo and sells for $2,035,660.

The largest systems, the 6070 and 6080, provide additional memory, faster throughput and larger communications capabilities. They operate at speeds one and a half to two times faster than the 6050 and 6060, HIS said.

Cycle time is 500 nsec per two 36-bit words. Memory sizes range from 128K to 256K in increments of 64K. These systems also offer two-way and four-way memory interleaving and instruction overlap. The I/O throughput is 6 million char/sec for each IOM.

A typical 6070 batch system, consisting of 192K words of memory, 12 mag tape drives with dual controllers, three 1,100 line/min printers, two card readers, card punch, console and 1,064 million characters of disk storage, carries a lease price of $61,505/mo and a price tag of $2,740,060. A comparable 6080 will lease for $63,305/mo and sell for $2,823,260. All HIS prices are bundled.

First deliveries of the 6030, 6050 and 6070 will be in July. The 6040, 6060 and 6080 are scheduled for the first quarter of 1972.

News Wrapup

Maoists Invade IBM French Office

TOULOUSE, France – At 7:45 in the evening Tuesday, Feb. 16, a group of Maoists invaded an IBM branch office here and damaged a 360/40 and its printer by attacking it with steel bars.

The group also scattered copies of a pamphlet, "The Maoist," through the data center. It was reported they apparently were protesting American "imperialism" and the arrest of Angela Davis.

No one was injured, even though operators were on duty at the time. IBM has not established a dollar value for damages, but the CPU was down for 48 hours, and the printer apparently destroyed.

This was the first major disruption of an overseas IBM office in well over a year. The last such foreign disruption was a year and a half ago, when a bomb was discovered in a branch office outside Montreal.

Students Protest Laos, Occupy Center

PALO ALTO, Calif. – Protesting the recent invasion of Laos, about 200 students brike into the Stanform University Computer Center and occupied it for three hours.

The computer center was chosen, it was reported, because a student group called the War Crimes Tribunal had revealed that the computer center was used for Department of Defense funded research. In particular, the students objected to a program run recently by a Stanford Research Institute researcher to study naval invasions. The students charged that the research related to a possible invasion of North Vietnam, but the researcher said it had no connection with Southeast Asia.

A university spokesman called damage "minimal" and said the computer was operating the next day.

IBM Says It Will Not Exhibit at 1971 Joints

WASHINGTON, D.C. – IBM will not exhibit at either the Spring Joint Computer Conference in Atlantic City, N.J., May 18-20, or at the Fall Joint Computer Conference scheduled for Las Vegas this November, CW has learned.

The company said: "This is a business decision based primarily on marketing and media considerations. We have increased our emphasis on advertising. Although we will not be exhibiting, individual IBM professionals will continue as in the past to participate in the professional program of the conferences."

Bill Would 'Watch' Computerized Billing

HARTFORD, Conn. – Consumers enraged by computerized billing practices are raising their voices, and being heard. State Rep. Gerhard Spiegel has filed a bill calling for companies whose computers don't clearly answer customer's billing inquiries within 60 days to forfeit all interest charged from the date of purchase.

Computer's Arrest Power Gets Safeguards

WASHINGTON, D.C. – Residents who received arrest warrants generated by the Central Violations Bureau IBM 1100 have complained that computers are not empowered to have people arrested.

Under the Constitution, they argue, arrest warrants may be issued only after "probable cause" has been established that a person has committed a crime.

The computer has dutifully been spewing forth about 175,000 warrants annually on the basis of parking ticket information. Chief Judge Harold Greene of the District of Columbia Superior Court announced a six-point program of "safeguards" to protect citizens from the computer's acts. Under the new procedures, a policeman's ticket as fed into the computer must contain a declaration sworn under penalty of perjury that the information is correct. But Greene said he was not sure if this will resolve the constitutional question of a computer's right to issue a warrant, and suggested a six-month trial of his system.

'Bug-of-Month' Award Goes to MIT Scientist

NEW YORK – The Association of Computer Programmers and Analysts awarded its February Bug-of-The-Month to MIT scientist Donald E. Eyles for on-the-spot computer program alteration in saving the Apollo 14 moon landing from being aborted.

After the discovery that a faulty switch aboard the lunar module was sending a spurious signal to the craft's main computer, setting it up to abort the mission, the astronauts made a frantic call to Mission Control at Houston who, in turn, thrust the problem upon a standby "watch" team at MIT.

Eyles was able to circumvent the difficulty by rewriting the computer program and having the new program inserted into the computer by the astronauts just moments before their descent to the moon. His solution involved punching in 26 sets of five-digit figures which would cause the on-board computer to overlook the wrong information given it because of the faulty switch.

Machines Get a Charge From Nylon Panties

LEEDS, England – The bra was the first to be dropped – will the panties be next?

Consider one of the more intriguing theories for the cause of computer errors espoused by Harry Eastwood, manager of the Leeds University computer center. Eastwood noted dropped bits can result from a girl in nylon panties walking by the computer. Apparently static electricity builds up in the underwear and can cause problems in computer circuitry.

Artificial Intelligence—Part 1

Industrial Robots Very Practical

By Edward J. Bride
CW Staff Writer

An expensive, computer-controlled robot may some day be whisked off to another planet, or galaxy, to explore the unknown in an unknown environment, to risk unknown dangers and to relay information back to earth, all without jeopardy to a human life.

This prospect is often taken as fact by the proponents of artificial intelligence, a science that is misconstrued because of publications and movies about computers taking over society.

These proponents claim that, if not now, some day "robots" will be capable of virtually unlimited programming, so they will be able to deal with unforeseen circumstances without continuous human monitoring.

Developments within this strange science, while often not dramatic, now include primitive robots with some optical input capabilities.

The intermediate possibilities are exciting: constructing models of the thought process, creating new high-level languages to communicate with computers, constructing biological models for use in medicine and producing industrial robots for automation.

The independent robot, while equally exciting, is a goal not likely to be reached in the near future.

Dr. Marvin Minsky, of MIT's Artificial Intelligence Laboratory, recently said he had "plenty of reservations about whether it would be socially desirable" to convert artificial intelligence projects into "advances in industrial automation." Nonetheless, this appears to be the object of much research in this field.

Minsky did say that, with improved programming, computers could be made to do more of the "unpleasant jobs."

This aspect is emphasized by pro-

Recent publicity on Shaky the robot has stirred much controversy in the computer community, particularly among those working in the field of artificial intelligence.

The misconceptions wrought by predictions of machines subverting man, and some actual applications of this unfortunately named science, are examined in this series.

ponents of the science when others claim computers dehumanize man. Dr. Ruth M. Davis, new director of the Center for Computer Science and Technology at the National Bureau of Standards, is an advocate of the "rehumanizing" theory.

An impetus behind much of this research when she was assigned to the Pentagon, Dr. Davis told CW that, by taking over some of man's menial tasks, computer-robot teams could help develop better jobs for man. She noted several studies which prove computers have already created more jobs than they have replaced, having eliminated some of the trivial or dangerous tasks in industry.

But the pursuit of this goal is not accepted by all of society.

Critics of artificial intelligence research are comprised mostly of scientific skeptics and people fearful of losing their jobs to automation.

Members of the latter category must have been somewhat alarmed at a Japanese company's recent announcement of a robot which it expects to evolve into a machine "trained to work in assembly lines, quality control, baggage handling and other tasks requiring precise judgment and handling."

Computers used in refinery process control systems for example, now open and close valves when pressures indicate the necessity, so that humans are supervising, and need worry about checking all points only when the computer indicates there is a problem.

The non-manufacturing repetitive jobs, such as payroll preparation, are already far down the road to automation, and the replaced clerks have either transferred to different divisions, become programmers or have taken supervisory positions.

In all these cases, however, the computer or the robot is unlike the science-fiction humanoids with self-contained programs, bent on destruction or subversion of the human race. These machines resembling humans would be prohibitively expensive to build, according to some scientists who also challenge their very practicality, the motivation behind building them.

The industrial robot, then, is a different machine, operating in tandem with a computer to perform repetitive and sometimes tedious and complicated tasks.

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Auditor Must Be Involved In DP, ACM Speaker Says

By Thomas J. Morton
CW Midwest Bureau

CHICAGO – "The auditor," said Robert W. London, vice-president and manager of the New York office of Brandon Applied Systems, Inc., "should play an ever increasing role in data processing from the earliest stages of systems development right up through post installation evaluation."

London, speaking before an audience of auditors, business executives holding financial management responsibilities, and DP professionals at an Association for Computing Machinery (ACM) professional development seminar here, stressed that, generally, the auditor is not DP-oriented.

"But he should be," London told CW, "not in the sense of the development of programming or analyst skills, but he should become conversant, and adequately so, in data processing operations and techniques."

The auditor, London said, finds himself somewhat stymied by data processing, particularly by the communications gap. Since the auditor speaks a language well-known in the business world, the DP professional is not hindered by it, London explained.

"Since the auditor can't lick them [EDP] and is hesitant about joing them, he's "absorbing" the DP profession. Now the DP man is becoming part of the internal auditing role, which forces him to learn the techniques and functions of auditing before he can impart his knowledge for the benefit of the internal auditor," he said.

"The auditor," he said, "must get into the machine room, he must make himself available to data processing." London feels that the auditor should participate in total systems development with special emphasis on machine reliability.

Bytes and Bauds

"Not in the sense of bytes and bauds and nanoseconds; that's not his responsibility. But he should be certain that the hardware/software system being considered is one that will perform the requirements he feels should be in the processing of the data."

The auditor, London maintained, should also be a part of the systems design to be sure that the proper audit trails and controls are not only in the system, but in the system where they will benefit the whole.

Also, in the matter of corporate resources, London said that most losses of resources are caused by the carelessness of humans.

In such cases, the auditor is "after the facts," discovering the loss.

With the auditor involved in the manipulation, storage and communications of corporate information and corporate transactions via DP operations, the auditor now becomes "before the fact" and can assist DP in preventing acts of carelessness.

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Vets 'Hurry Up, Wait' for Checks

CW Midwest Bureau

CHICAGO – To anyone who has "pulled" much time in the armed forces, "hurry up and wait" will not be an unfamiliar term. But most people thought they were through with that when they were discharged. The Veterans Administration recently taught them the error of their thinking.

As many as 2,000 veterans here, part of a group of about 60,000 across the country, are waiting for their VA checks because of a mistake at the VA's Philadelphia computer center.

Edward T. Kelly, assistant director of the VA Chicago regional office, explained the mistake: "A large batch of cards should have been sent through the computer (for check writing). Instead, they were sent back here to the regional office.

"When the computer came to those veterans' names, there was a bar so the checks were not issued."

Kelly said the center was making a special run of the misdirected cards to allow the checks to be issued.

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Editorial

Blackouts Inevitable

Let's face the unpleasant fact. Unless an installation has backup power that switches on automatically when the regular power fails, it is going to be blacked out one of these days.

And most users don't have backup power. They haven't even really given the problem adequate thought.

The first question is: Will the equipment be physically damaged if the power fails without warning? If it will be, can the installation afford to be off the air until repairs can be made? If not, then at least temporary backup power, enough to allow the system to come to an orderly stop, is a must.

The second major question is: What problems will develop while the installation is off the air?

The selective blackouts in England uncovered some interesting problems in this area.

Installations that had made arrangements with other users for backup discovered that these users had made many such commitments. And obviously they didn't have the capacity to handle so much extra work all at once.

Installations with remote terminals discovered when the mainframe had power, the terminals didn't, and vice versa. Even installations with backup power were affected when the terminals lacked power.

Britain's National Computing Center conducted a poll that indicated 70% of the country's computer users were affected by the power cuts and voltage reductions.

So now's the time to make plans – while the lights are still on.

'Sorry, Pal – Members Only'

Letters to the Editor

Paying Overtime And Rotten Software

The Feb. 10 issue shows the EDP industry unanimously against programmer overtime and Alan Taylor noting that our software tools are faulty. Paying overtime is something which can be done about our rotten software. Those programs tested and debugged between 5 p.m. and 8 a.m. are usually worth exactly what the employer paid for them.

John H. Davenport CDP
Vice-President
Ampersand Corp.
York, Pa.

Center Endeavoring To Optimize Cobol

Alan Taylor's column [CW, Jan. 20] brought up questions, since our shop is presently trying to improve Cobol program efficiency.

The programmer was quoted as preferring three techniques, and our inference was that they are all inefficient. "Charlie's Loop" is described as "a simple, time-consuming way of programming," but what is it, in order that we may avoid it?

We are aware of the time consumption incurred by double subscripting, the second technique. Is the third technique, "main stream with subroutines tacked on at the end," inefficient, and how so?

Since other programmers must have had similar questions, another column by Taylor, explaining the efficiency to be gained versus the possible reduction in readability or increase in debugging difficulty, would surely be well received.

S.B. Davis
Programmer
County of Sonoma DP Center
Santa Rosa, Calif.

Sampling of Washington Area DP Schools Shows Placement Problems Decreasing

WASHINGTON, D.C. – While Control Data Corp. is firing experienced programmers it is simultaneously hiring graduates of its private EDP school unit, Control Data Institute, as entry-level programmers.

This fact came to light during a sampling of EDP schools in the Washington area to determine how the current economic squeeze is affecting them.

A spokesman for the corporation said in Minneapolis that the number of layoffs among programmers "has not been large." No figure, however, was available, he said.

Throughout the country CDC, he explained, hired 94 graduates of its institutes in 1970 as opposed to 134 in 1969. Since last July 1 CDI in the D.C. area placed 19 of its graduates with Control Data in the metropolitan region.

D.C. Data-Line
By
Alan Drettell

The company's Washington Systems Division is project-oriented rather than product-oriented, and this fact may be one reason for the hiring of CDI graduates.

No New Work

In a project orientation, programmers are hired for a specific project and when it is completed they may be fired if there is no new work for that specific group. At the same time, an organization "down the hall" might be staffing up for a new program and must hire people according to a salary structure that will permit the company to make money.

For example, the new project may call for a majority of individuals to come in as $7,000 a year programmers, precluding the transfer of trained people from other completed project areas.

This project orientation is particularly noticeable in the aerospace and defense-related industries, and this may be one reason that many of these companies are having difficulty trying to move into the commercial marketplace.

Overall, in the Washington area, most of the schools in the survey indicated that placement problems are not as bad as they were a few months ago, and that there are still jobs open for the top 10% of the graduates.

"Because a $20,000 a year man is unemployed doesn't mean there isn't a place for the $7,000 or $8,000 a year man," said Marvin Martilla, director of Technical School. "We're probably attracting a little better grade of student," he added, because of the current economy, and he also noted that there has not been a drop in demand for keypunch operators.

"Many employers like to get private EDP school graduates," said Eugene Axelrod, vice-president of Computer Learning and Systems Corp., "because they can hire them at $3,000 to $5,000 less than the guys who have two years or so of experience, who would probably take jobs at a lot less money now anyway."

Axelrod said that Computer Learning has not cut the number of classes it holds in the Washington area but it has cut them in Los Angeles because of the placement problem in southern California.

"We're working a lot harder in the Washington area, though, at placing our graduates than we had to before," he added, "but a great deal of the problem still lies with getting the cooperation of the students themselves. There are some, for example, who just won't spend the time it takes to get a job." Axelrod said that Computer Learning has a monthly mailing that goes to about 800 prospective employers.

'Good Conscience'

According to Charles Gold, president of the Lear Siegler Career Center, the demand for entry-level programmers "is not there right now and with good conscience you can't train a student you can't place even though we don't guarantee placement." He added that Lear Siegler will train less people in 1971 "by choice."

In the past, newspaper articles talked glowingly about the opportunities that existed in the computer industry, but the stories have been different the past year and Gold said that potential students are voicing increasing concern about the job crunch.

Opal Benjamin, a counselor at ITT Business Institute, said that last September and October placement activities were very bad, and she also bemoaned that "there are so many schools now we're not getting as many students.

More Details

"Potential students want to know more details regarding the EDP industry, and we make these very clear in our sales. What with all the astronauts (the interview with Mrs. Benjamin was held during the flight of Apollo 14) flying around and the part computers play in it, you'd think things would get better for selling and placement."

The counselor said that ITT places its students with private companies and with federal organizations including the General Printing Office and Goddard Space Center.

One victim of the present economy, however, has been Univac's Education Institute which is being phased out across the country. "The field was flooded," said a spokesman.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

There Are Problems...

But the News Is Reaching You Faster Than Ever!

A few weeks ago I wrote about the system designers and their arrogance. Quite a lot of you wrote back with some of your favorite examples. A number of these were from *Computerworld*!

There was a Canadian subscriber, for instance, who found the third name of his firm, Christianssen, broken off after the Ch! There was the gentleman who wanted to renew, but was fed up with being addressed as "7MITH" and wanted his real name to be used.

There were a number of people drawing attention to the CW request for information on what type of business they were in, etc. And there were quite a few people noting that after they had paid they were still getting renewal notices.

I found these very interesting from a number of points of view. To start with, I remember the first circulation department of CW which was in our dining room, where my wife would stay up after midnight until she answered the complaints. And I remember those complaints very well.

Early History

At that time they were not about the addressing, or the position in the labels, or the renewal notices. They all pertained to the fact that the paper was not reaching them on time.

One early subscriber rang up saying that his copy of the paper could not possibly be taking 10 days to get to his office in the center of Boston from just across the river in Cambridge (which is where we were then publishing).

Luckily he had a sense of humor, and when he was told that the time was being used not in going from Cambridge to Boston, but just in going from the Boston Post Office only two blocks from his office, he laughed instead of blowing up.

And if the Boston subscribers were unhappy, the letters from California were utter nightmares.

In the planning of the paper we had done everything possible to get the news quickly to the subscribers. We only considered a weekly newspaper (with paid circulation) because anything less could get the best handling by the Post Office.

It was posted very early on Wednesday mornings, because this was when the Post Office volumes were at their lighfest. The closing time was 5 p.m. Tuesday afternoon, so that all the latest news reached our subscribers.

We had worked hard – so the complaints hurt.

No Such Complaints Now

Naturally, when I started getting the mail about CW subscriptions, what I really noticed was the absence of these complaints about delivery. I then went down to CW to find out what was happening, because some of the complaints were definitely justified.

When I got there, I was delighted with what I found out. To start with I learned that CW was also reading the complaints and was trying to do something. Indeed I had found that it had already been taking action for some time.

On the desk of Walter Boyd I found a dummy of a new front page logo with the latest *Computerworld* moved over to the right so that the label would go on without obscuring it.

Actions Taken to Improve

I found that CW had moved the subscription operation from a computer system that accepted many transactions which should have been rejected, onto another system which gave it better control. The paper had also started doing the keypunching in its own offices for better control.

I found that there was a good reason behind the word "need" in the request for title and industry information, but that CW was pressured to explain it a lot more clearly.

(The reason is a fairly simple one. The needs were laid down by Business Publication Audit of Circulation, Inc. (BPA) as being the condition under which a subscription can be counted as being "qualified." This is an industry-wide organization, and qualification is important because of past abuses in estimating a publication's circulation. CW circulation is audited so that the advertisers know what they are getting, and BPA, as the audit organization, has laid down the rules.)

I even found that CW had gone a bit ahead and included a key in the code which indicates that a subscriber does not want his address used for anything except delivery of *Computerworld*.

Speed Virtue Kept

I also noticed that the key characteristic that worried us in 1967, the question of how quickly the news can be put on the subscriber's desk – still was of concern, and indeed was the main reason for the change of computer systems.

The new software, which had been prepared by Crain Communications, Chicago, took into account train deliveries, train schedules, and bag sizes. If necessary it could consider carrier-routing by the Post Office.

As a result of this intricate and sophisticated programming – though the final closing time of the paper (the time when the latest news can still be put) had been kept at 5 p.m. on Friday evening – the printed paper now reaches many more subscribers on a Monday morning than ever before.

As far as I know there is not any other weekly newspaper that is able to maintain a better information flow. It is not perfect.

With the latest change there are still a few areas of the U.S. that do not seem to be able to get the paper on Monday through the Post Office services. These include: Florida, Georgia, Hawaii, Nevada, sections of Oregon and Washington, and Alaska.

But since the changeover, which only occurred in November 1970, many areas that previously had to wait until Tuesday, Wednesday, or later are now receiving CW on Monday.

Still Problems

However, there are still some points where there are problems. Renewal situations are one of them. In the software package Crain decided that too many false inputs were being provided through duplications. (In fact, in part of the conversion operation some $5,000 in ticket payments for subscriptions were located and refunded to subbcribers.)

Crain therefore put a basic restriction in the software that only one transaction will be allowed to update the main file in any update cycle.

Personally, I think that this is an error, and I am expecting that as the figures come in and experience is gained by those working on the system, it will be found that they can lift this restriction. Certainly Bill Strong, vice-president and circulation director at Crain, and Ed Viktor, the DP manager, circulation, are checking and watching this area.

There was, and still is, a major question with the treatment of renewals, changes of address, etc. With the extensive editing (because of the complex match-code that is used in place of a subscriber's invoice number to prevent error) preparation of input currently seems to be taking too long.

Also with the problems involved in any conversion, and the fact that the input is sufficiently complicated to make it impractical to get temporary help to process the work, the time lag in processing input had been allowed to get longer than the renewal cycle.

This has been partly changed by making the second renewal cycle (that is the issuing of reminders to those who have not paid by the first renewal billing) a variable rather than a fixed cycle.

But still the question of the timing of renewal notices is too important to just push under the rug.

Can You Help?

Here I found that neither CW nor Crain Communications had the answer immediately. Perhaps you have. What is wanted is a good turnaround document for renewal subscriptions. The illustration shows the one currently being used.

It is all right, but it does not lend itself to fast stream processing that would allow at least the standard items to be handled quickly.

Can you suggest a better one? The volumes concerned at CW are approximately 80,000 input/yr, peaking to 5,000/week. The other publications which use the Crain Communications package have approximately three times that volume.

If you can suggest an idea, will you please send it either to me, or to Walter Boyd.

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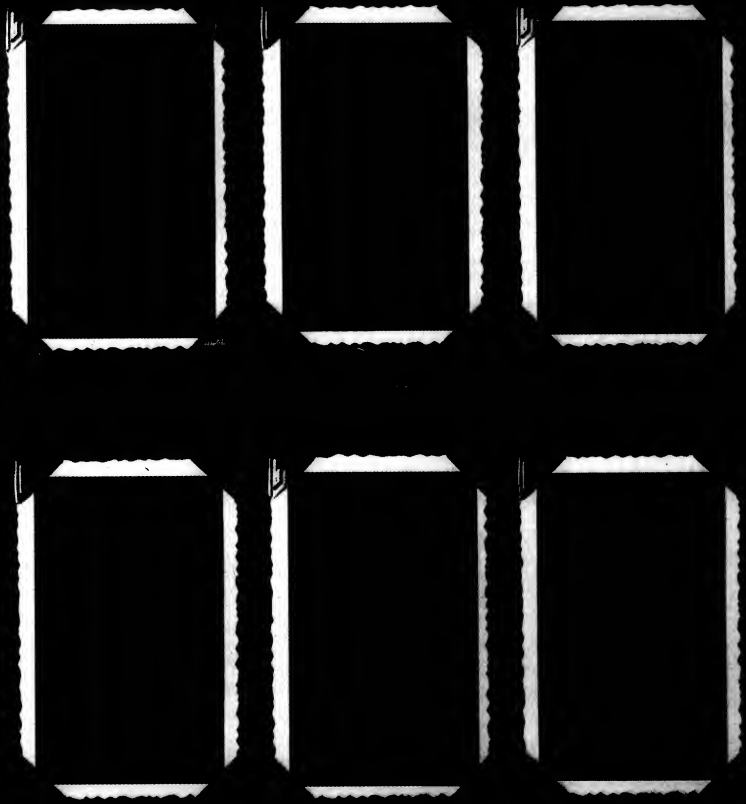

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1971 Input Supplement

February 24, 1971

Breaking the Bottleneck!

The emergence of alternate methods of data input may well be signaling the end of the "sellers' market" in data preparation equipment.

Since the earliest days of data processing, long before the first commercial computers became available, users were tailoring their procedures to match the very narrow choice of input media available.

Recent developments have allowed the user to change the picture dramatically, and in a manner to suit his own needs. More and more frequently, devices intended to eliminate bottlenecks in the processing of data from specific sources are being introduced and sold.

The most significant of these devices from the user's standpoint have been the key-to-tape and key-to-disk systems.

The reason for the success of the key-to-tape/disk concept seems relatively simple – it saves the user money by raising productivity without requiring major systems changes.

The activity involved in the adoption of the new keyboard devices does not necessarily indicate that progress is being made. Whether data is being keyed into one kind of machine or another, or if it is being put onto one intermediate storage medium or another, the fact remains that an intermediate step is being taken that could be eliminated.

This is the special province of those input devices that connect directly to the computer, the elimination of the middle process together with its inherent characteristic of allowing the introduction of errors.

The growth in the use of these devices, such as on-line OCR readers, automated cash registers, and automated timekeeping systems has been evident, but nowhere near what it could be.

Various reasons are given for this delay, but the basic one seems to be that many users simply do not want to use them.

Consequently, there has been relatively little progress made in the area of systems innovations. Most installations plod along with systems based on concepts derived from the unit record approach such as the punch card. But the time for change is here.

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A Guide to the Perplexed

Applications Determine Choice of Keyboard System

By T.J. Smith
Special to Computerworld

The computer user who has decided to replace keypunches with a new key entry system is frequently stymied by the profusion of different key entry systems which have come into the market in the past few years.

Multiple and single keyboard systems have created a price/performance hierarchy in each of several application environments.

Real opportunities exist for reducing reporting delays, cutting processing costs, and configuring for an evolving teleprocessing technology, but the selection of a system that is "wrong" for the user's environment can partially or completely negate any advantages.

There are five basic key entry options or product groups in use today: Individual key-to-tape units, multistation key-to-tape systems, multistation-key-to-disk systems with or without CRT, key-to-cassette systems with CRT, and on-line CRT terminals.

There is no system which is optimally suitable for every user environment.

User Environments

There are two basic user environments – the keypunch section and the office, or source entry point.

The keypunch environment can be classified according to the size of the section – eight or more keyboards; or fewer than eight keyboards. The office environment is classified according to location – in proximity to or remote from the computer.

There are many organizations in the first environment that channel formatted data to a large central keypunch department for entry, where operators enter data and key verify to assure accuracy in a closely supervised production situation.

Users who are not ready to move into source data capture may prefer to retain this setup with key entry systems replacing the keypunch machines.

Other users utilize groups of one to eight keypunches locally or at remote branch offices, warehouses or plants. Cards are transported or card data is transmitted to the computer center.

Source Data Capture

Indirect replacement of keypunch machines can be achieved by the keying and capture of data at the source by a clerk-typist. This arrangement places responsibility for data entry with the source department where the incentive for error-free and timely entry is greatest.

The personnel generates and understands the data and will most readily notice errors. Source entry avoids the need for transcription of information to card format.

The source department may be located either at company headquarters near the computer or at a remote office, warehouse or plant.

Key entry systems used at source data locations require more extensive automatic error detection than those at central keypunch sections and involve visual verification via a display. The office typist is less expensive than the keypunch operator, but is not as closely supervised and does not key verify.

Data formats at source entry are usually more diverse and flexible than those used for keypunching at the central facility and may be in the form of sales orders, purchase orders, inventory data, invoices, name and address lists, customer records, accounting records, personnel records, etc.

Large Keypunch Section

The central keyboard section utilizing eight or more keyboards has a choice of multistation key-to-tape, key-to-disk systems or on-line CRT terminals. The multistation key-to-tape system offers a monthly cost per keyboard ranging from $125 to $205 and provides keypunch-type keyboards connected to a controller and central magnetic tape recorders.

The cost for a typical standalone key-to-tape station without options is $165/mo.

Most multistation systems of this type are direct replacements for keypunch and offer similar options. Outside of low cost, they offer no other advantage over individual key-to-tape machines.

A principal disadvantage and risk is that failure of the control unit will cause idle time on the part of a large number of operators and a breakdown in the whole production process.

If multistation key-to-tape or disk systems are utilized, the workload should be distributed among two or more systems to reduce the chance of production breakdown.

An alternative for direct keypunch replacement of large sections is the multistation key-to-disk system using a minicomputer as a control unit. Some of these systems also offer a CRT display at the keyboard. This type of system has a monthly cost per keyboard in the $120 to $295 range.

In addition to providing processing and editing power of the minicomputer and the retrieval capabilities associated with the disk, the system can be used off-line from the main computer and not be subject to interference from computer malfunction. System failure is still possible, however, if the control unit fails. Logging of operator production and error rates is usually provided.

On-Line CRTs

Another alternative for the central keypunch section is the use of on-line CRT terminals for data entry under software control and edit. A limited number of computer vendors offer software to support key entry, but to date it is not in broad use on small systems.

The cost per keyboard is approximately $125/mo excluding expanded core memory and dedicated disk file. This application has the same risk of idling operators if the control unit or computer fails.

But, it offers the ultimate in sophistication, including the advantage of computer editing of incoming data for detection of format errors, together with more sophisticated comparison of data with other criteria for error detection.

For example, range checking of an entered quantity against a normal range of quantities can be accomplished to detect original or keyboard mistakes. Programs containing conditional logic may be used to test data entered on forms which contain formats that vary according to preceding data.

Retrieval and review on the screen may be a further advantage in some applications. The ability of the computer to log statistics on operator production and error rate may be desirable for supervisor use.

In determining the real cost of on-line CRT, one must be taken to identify the cost of extra computer time, memory, disk hardware and software.

In cases where formatted data entry occurs involving one to eight keyboards, the best direct replacement for a keypunch is the individual key-to-tape unit or the key-to-cassette CRT unit.

With a small complement of keyboards, it is not feasible to obtain a significant cost advantage in a shared system.

One of the expanding uses of the single key-to-cassette or key-to-tape unit is as a data communications station transferring large quantities of data from one point to another for processing or printing.

Office Near Computer

Source data terminals are being used increasingly by DP managers. The capabilities of on-line CRT terminals and multistation key-to-disk systems have already been discussed.

These systems lend themselves to this kind of source data environment when equipped with CRT and the necessary software.

The key cassette type terminal with CRT display is being used increasingly in the office application. Its text display aids a typist in using the machine and allows effective visual verification.

Automatic detection of alphanumeric format violations, incomplete fields, check digit verification, zero balancing and arithmetic features all contribute to its effectiveness.

Cassette files for local storage and retrieval together with formatted printing make the key cassette type terminal versatile.

Multistation key-to-disk systems with CRTs offer many of the same capabilities.

Beware of the key cassette type CRT terminal which must be user programmed. A terminal is only as useful as the functional capability it provides. If the vendor cannot demonstrate terminal software with all the capability needed, the user should not take on a do-it-himself kit. Efficient programming of a terminal microprocessor is even tougher than doing one's own mainframe programs due to limited memory size, the need to

(Continued on Page 5/5)

Key Entry System Selection Guide

User Environment	Key Entry Application	Type of Operator	Appropriate Systems
EDP central keypunch section (8 or more keyboards)	Formatted data entry (keypunch replacement)	Trained keypunch operator	Multistation key-to-tape system; multistation key-to-disk system; on-line CRT terminals
EDP keypunch section (1 to 8 keyboards)	Formatted data entry (keypunch replacement)	Trained keypunch operator	Key-to-cassette CRT terminal; key-to-tape unit
Office (within 1,000 ft of computer)	Source data entry	Clerk-typist or secretary	Multistation key-to-disk system (with CRT); key-to-cassette CRT; on-line CRT
Office (remote from computer)	Source data entry	Clerk-typist or secretary	Key-to-cassette CRT; multistation key-to-disk system (with CRT)

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Users to Benefit When New Card Size Is Adopted

By William Lutz
Special to Computerworld

The 96-column card introduced by IBM with its System/3 computers will eventually replace the 80-column card in most applications.

Such a change will bring the user benefits of increased hardware reliability, higher throughput rates, and lower hardware costs.

The 96-column card is smaller, can hold more information, and has space allocated for printing, as well as for punching.

Data is punched in a code that is more easily handled by EDP today as the Hollerith 12-bit code on the 80-column card is more awkward and requires complex code conversion.

The small card could become a standard because of IBM's commitment in making it the primary source of original data for System/3. By the end of 1970, 1,000 systems had been installed and a backlog of 10,000 units exists, according to industry sources.

Although it's just a matter of time before the 96-column card becomes the predominant form, the eventual conversion for everyone is a long way off because of the large base of the 80-column equipment.

There are over 600,000 keypunches that have been written off, performing well and doing their job. People will not get rid of them.

The 80-column card cannot just disappear but will die a slow death.

About one-third of the cards used in 1975 will probably have 96 columns. Newer applications areas, such as those using minicomputers and terminals, will see the 96-column card providing a significant or perhaps even dominant portion of the card input.

In certain applications, such as in bank checks and other uses where the size of the document is important, the 80-column card will have to be retained, however.

The 96-column format is particularly suited to a number of applications currently being considered and developed.

With off-track betting, for example, the card would be the basic document; computerized ticket agencies would use the cards as tickets.

Retail sales applications are also being investigated and a reliable, foolproof system could result in almost unlimited value.

The new card size will also bring the user the benefit of simpler equipment, resulting in higher reliability. The card reader is not a great deal different, but the punching equipment shows significant differences as a round hole is easier to make than a rectangular hole.

The cost to manufacture a punch and die to produce a rectangular hole is high. Engineering is more complex and to achieve long life, very hard materials have to be used. Carbide steels, for example, must be used in equipment that operates at speeds of 100 card/min or more.

For round holes, standard metal stock can be used for the punch. As for the die, round holes are easier to engineer. The fact that the round hole requires less force can result in a quieter machine that produces less stress on its parts and gives higher reliability.

The user will then get a punch that is less expensive, more reliable, and require less maintenance.

The user can probably expect higher throughput rates with a 96-column card.

Newer machines that have been designed for the small cards will also be characterized by simpler construction, in part made necessary by a growing trend toward remote operations where service is not as easily obtained. Along with the simplicity will come reliability.

Better designs will probably push the manufacturers into adopting the 96-column card, with lower costs and increased reliability accruing to the user.

William Lutz is vice-president, marketing and planning, for Bridge Data Products, Phila., Pa.

User Choice Determined by Utilization

(Continued from Page S/2)

program in low-level language, and the relative scarcity of experienced personnel.

Again two alternatives are presented – the key-to-cassette CRT terminal and the multistation key-to-disk system with CRT. Both are available with communications and hard-copy options in addition to their suitability for source data entry.

In the remote office environment, where few terminals are needed, the cost advantage will be with the key-to-cassette type. Where a larger number of keyboards is involved and the cost of the disk system is justified, its use as a remote file storage and retrieval unit should be exploited.

The multistation key-to-tape system is recommended for the large keypunch installation; and key-to-tape units for small keypunch installations.

Key-to-cassette terminals are recommended in three environments: small keypunch, and computer proximity source data, remote source data.

On-line CRT terminals are suitable in two instances: large keypunch and computer proximity source data.

Keep in mind again that in selecting a key entry system, the focal point should be the user's environment. Without this orientation, the wrong entry system may be selected and many sought-for-advantages will not be achieved.

T. J. Smith is vice-president, marketing, for Xycor, Inc., Ann Arbor, Mich. He has had 16 years of engineering, marketing and business management experience in instrumentation and data processing fields.

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Software Is Key to Key-to-Disk System Evaluation

By Paul B. Landry
Special to Computerworld

Shared processor or key-to-disk equipment is set apart from other alternatives by editing and validating capabilities built around a computer. But the real advantages of key-to-disk are in the pre-processing of input.

The typical key-to-disk system is based on a low-cost minicomputer, features random access intermediate storage (either disk or drum) and outputs onto magnetic tape.

Various manufacturers offer systems with clusters of keystations ranging from eight to 64 per system, with the requisite central processor, disk and tape drives.

While most work stations are designed on familiar keypunch concepts, several manufacturers incorporate CRT displays into each station. They point out that comprehensive data display is beneficial in operator training, and makes operations such as verification and editing easier and more accurate.

The best of these systems are capable of genuine pre-processing and eliminate the editing, validating, balancing, reformatting and reblocking that historically (and often expensively) have been done on the mainframe or perhaps on EAM gear.

Questions to Ask

To help the user evaluate a key-to-disk installation, consider these questions on the system's software architecture:

- Is the software based on hard-wired core and disk arrangement?

This can lead to serious limitations of record length and batch size, and make automatic re-assignment of disk location difficult or impossible.

A preferable system is one that dynamically allocates core and disk storage and offers unlimited record length, unrestricted batch sizes, and logical expansion to accommodate more terminals.

- Can the system reformat the input?

Because the major advantage of pre-processing is the ability to edit input, the software should permit easy insertion or deletion of entire records.

In addition, entry operators should be able to key from the source document the simplest way, which is top to bottom, line by line without skipping.

The system should then be able to reformat this data exactly the way the computer wants it. This permits full utilization of the system without the cost and trouble of software modification of the host computer.

- How big a data entry system is needed?

Obviously, it should be powerful enough to get the work done. But it should be expandable, in terms of record length, future on-line interfacing, and ability to handle additional terminals (either singly or in groups).

The user should avoid getting locked into a static system design.

Work Station Design

In order to make keying as easy as possible for the operator, the current philosophy holds that the operator should be shown only what she needs to know.

This has been translated into vague, diagnostic indicators and character displays in cryptic codes. Often a multitude of extra keys and switches labeled in computerese are included.

Such "simplified" work stations usually require more complicated (longer) training, and permit a higher probability of keying errors, since the operator is required to carry the entire record format in her head.

With a CRT the operator sees what she is doing and the CRT is not distracting. The operator is shown – in context – the record being entered.

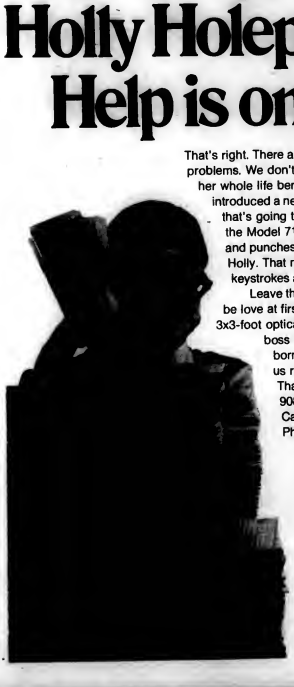
The CRT also performs a valuable function when verifying. Depending on the critical nature of the data to be verified field-by-field, the CRT permits visual scanning for accuracy.

For complete flexibility, the CRT should permit full key-verification and combinations of key and visual verifying to suit the application at hand.

The display screen is also a powerful aid in the quick, error-free insertion/deletion of partial or whole records.

Paul Landry is director of marketing for Entrex, Inc. He was formerly with Mohawk Data Sciences and Honeywell where he was engaged in the development and marketing of key-entry devices.

Cheer up, Holly Holepuncher. Help is on the way.



That's right. There are some people who care about your problems. We don't think a girl should spend her whole life bent over a hot keyboard. So we've introduced a new optical scanner/card punch that's going to help you and your boss. We call it the Model 710. And it automatically scans and punches up to 6000 cards an hour. So, smile Holly. That means about a half-million fewer keystrokes a day for you.

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DATA RECOGNITION CORPORATION

Bankers Still Say Micr Will Stay

By Frank Pisetz
CW Staff Writer

NEWTON, Mass. – OCR may replace Micr as the favored method for reading checks and similar documents into data processing systems, but that day is not going to be very soon according to a recent sampling of executives involved with bank EDP activities.

The consensus was that OCR as yet had not demonstrated the capability to overcome the faults that were responsible for its rejection in favor of Micr as the ABA standard.

These faults are centered in the need for documents to undergo a great deal of processing and handling before they are read into the system.

Checks accumulate a multitude of cancellation stamps, plus dirt and smudges, along their route to the bank on which they are drawn. These marks cause a relatively high rejection rate in OCR systems while being invisible to Micr.

But banks have not discarded optical systems. Most executives were unanimous in saying a controlled OCR system can play a major role. Many sophisticated banks have discontinued keypunching much of their internal data, and have it typewritten instead, with eventual optical input in mind.

Backup System

OCR is also considered as a possible backup to the Micr systems in order to reduce reject rates. Currently, about 2% of documents read with Micr equipment winds up in the reject pocket, and the use of OCR can eliminate the necessity for the introduction of substitute documents.

Whether this process takes the form of a hybrid machine that uses both reading methods, or of a second machine that also allows manual entry of unreadable characters, it should eliminate the reject bottleneck.

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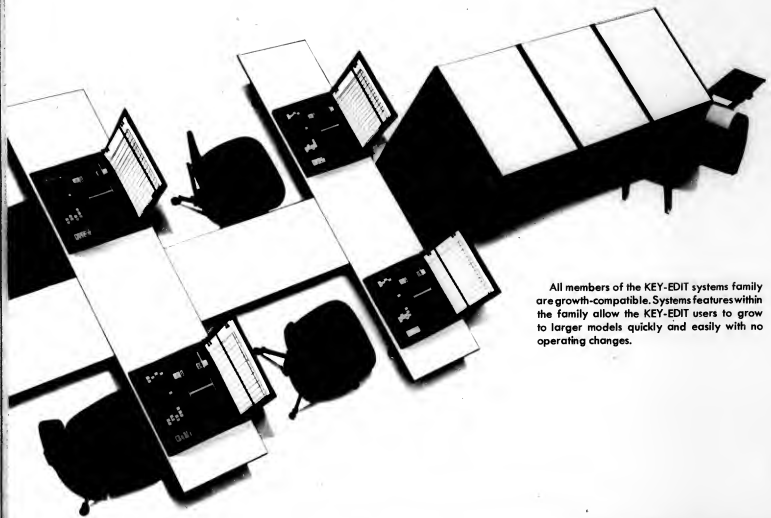

All members of the KEY-EDIT systems family are growth-compatible. Systems features within the family allow the KEY-EDIT users to grow to larger models quickly and easily with no operating changes.

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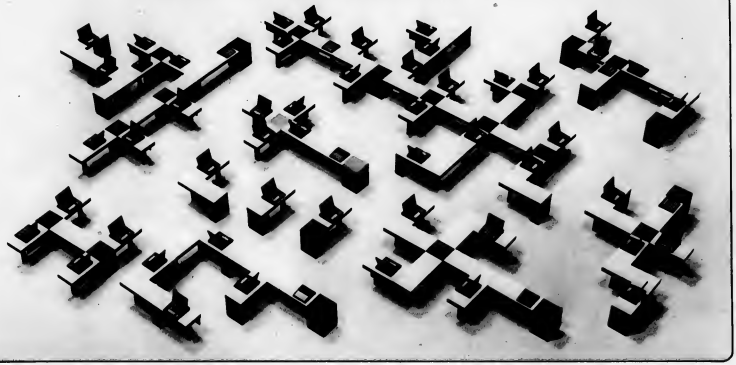
New! The basic KEY-EDIT 100/100 is now available with a variety of newly designed data stations. Illustrated below are some of the optional configurations and model colors now being offered with the original Incredible Reducing Machine. Contact Consolidated Computer today for complete details on the KEY-EDIT 100/100.



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This communications-oriented addition to the KEY-EDIT™ family, with powerful control and editing features as standard, can be tailored to a variety of user processing needs.

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360 Software Package Improves On-Line Entry System, IBM Says

By D.F. Myrick
Special to Computerworld

By allowing keyboarding of source data directly into computer disk storage – by-passing the usual punched card operations – the use of an IBM program, Data/360, can result in faster data entry.

Particularly in installations with a high volume of keypunching, the transition to on-line data entry using Data/360 can reduce input cost and increase operator productivity and throughput.

Data/360 operates under DOS/360 or OS/360, and uses 2260 display stations for source data entry. The 2260 terminals, serving for both data input and verification, have the same keyboard layout as the 026 and 029 card punches.

As data is keyed in, it is displayed on the 2260 screen. If the operator senses a keying error, she simply backspaces and corrects it.

With no delays for card feeding, registration, duplication, skipping and stacking, keystroke rates are 50% faster. Short keyboard commands start jobs, reducing setup time.

Input records are transmitted from the 2260 terminals into the CPU through a 2848 display control. Each record is edited and formatted according to a document description previously read into the program. Fields are automatically checked, filled with blanks or zeros, duplicated or accumulated. The DOS version provides format control of up to 16 fields and three formats per document; the OS version, up to 24 fields and seven formats per document.

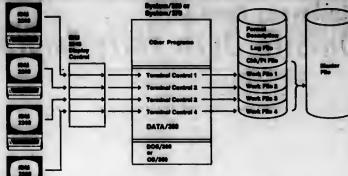
If the program detects a format error, the keyboard locks and the error fields are identified on the screen. The operator then corrects the error or rekeys the record. Edited records are transmitted to a disk work file associated with the entering terminal. When the operator signals a completed batch, the data is transferred to the master file for later verification.

Verification is accomplished from any terminal by requesting and identifying the data through keyboard commands. The records are then reentered and automatically compared with the original entries. Any differences are resolved by the operator in context, with a full display of both entries where they differ.

Verification is faster because records can usually be corrected without a separate rekeying operation. Data/360 provides production and error statistics to spot trouble areas and aid in management control of data entry functions.

In installations with 12 or more keypunches and verifiers, less space is required since keypunches are replaced by fewer and smaller devices, and fewer cards are used, requiring less storage space. Generally, the transition to Data/360 requires minimal retraining of operators familiar with the IBM 029 card punch or 059 verifier.

D.F. Myrick is senior product administrator in the Data Processing Division of IBM.



Data Flow Entered Through Data/360

Front-End Processors Could Benefit Users Of Computer Utilities

By Frank Plasta
CW Staff Writer

The availability of communications for small computers, allowing their use as front-end processors, could prove extremely beneficial to the users of computer utilities.

The presence of local computing power would certainly allay some fears concerning control harbored by many users, while the availability of the large-scale time-sharing system could allow the user to implement a few large applications and wind up paying only for the time actually needed.

One of the most serious drawbacks that has faced the time-sharing user can be eliminated through the use of other devices that have faster I/O than the teletypewriter.

In the past, most data has been transmitted at 110 bit/sec, using teletypewriters. Faster methods could be used.

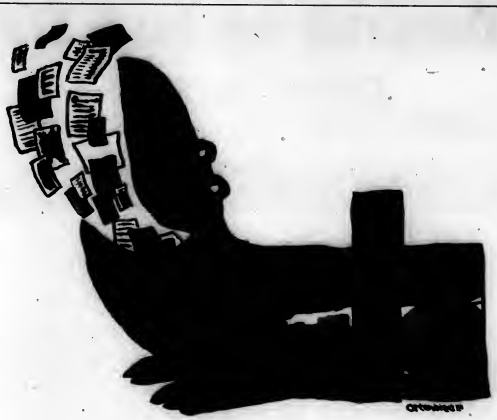
A local processor could prepare data for transmission, and store it on a disk, or magnetic tape for relay to the utility. When called for, the data would then be transmitted at much higher data rates.

While the higher data rates are currently being used only experimentally over the switched networks, the adoption of rates around 4,800 bit/sec is not too far in the future.

The increase in rates would mean a decrease in both time on the line and connect time to the computer. These savings would probably more than pay for the more sophisticated equipment needed and could result in a net savings to the user.

The speed of output from the computer utility could also be improved by having a local processing system. Throughput could be written onto tape or disk at high speed, for later transcription, rather than being limited by print or punch speeds.

(Continued on Page 5/21)



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Timekeepers Punch Cards

On-Site Data Entry Improves Overall Processing

By Arthur F. Hird
Special to Computerworld

NEW HAVEN, Conn. — The Winchester-Western Division of Olin Corp. has devised a simple data entry system that extends the value of its timekeeping and status (production starts and completions) reporting functions, without adding to staff.

Instead of preparing source media for keypunch operators, the timekeepers complete the punched cards themselves – ready for processing by the company computer.

The same people are involved, but the new method of operation has significantly improved overall data processing for payroll, labor distribution, job cost, scheduling, labor efficiency and job status reporting.

Central keypunching is still by far the most prevalent way to record data for computer processing. When such data is straightforward and standard, it is probably the most efficient for most DP requirements.

Many plant operations, unfortunately, are not straightforward – and the more nonstandard they are, the more special computer programs are required to integrate them into the overall system for report generation.

The potentially high error rate for such nonstandard keypunching can create a serious "credibility gap" in the minds of management executives for whom the reports are prepared.

When this situation develops, reports become worthless, and the cost and effort required to produce them is wasted.

It is apparent that timekeepers are far more familiar with the intricacies involved in the proper allocation of labor than keypunch operators. For some time, the idea of having timekeepers record labor and job cost data directly to punched cards had intrigued the author.

The opportunity to implement this plan came with the introduction of the Vari-Punch printing keypunch. This device seemed ideal for this approach to source data entry. Four units were ordered for testing and evaluation.

The first punches were delivered in March, 1970. After a trial period, more units were acquired. The timekeeping section now uses 12 units for labor and status reporting on 26 manufacturing and assembly departments.

No Procedural Changes

No significant procedural change was involved. As in the past, cards prepunched with current fixed data are maintained for each standard manufacturing operation.

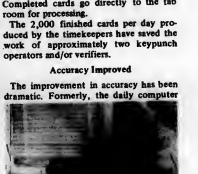
Working from tally sheets made out by employees on the plant floor, the timekeepers formerly pulled the appropriate direct labor job card for each line on the tally sheet and wrote the variable data (date, quantity, employee number, shift and hours) on the card. At the end of the day, the cards were forwarded to central keypunching.

Now, instead of entering the variable information by hand, the timekeepers punch it into the cards on their desk top keypunches with no increase in time. Completed cards go directly to the tab room for processing.

The 2,000 finished cards per day produced by the timekeepers have saved the work of approximately two keypunch operators and/or verifiers.

Accuracy Improved

The improvement in accuracy has been dramatic. Formerly, the daily computer listing of errors ran seven or eight pages, most of which were attributed to keypunching, legibility problems, etc. It took four or five hours to correct these errors.



Peg Capper, supervisor, checks a direct labor job card punched by timekeeper.

The daily list now consists of about 10 errors, which can be corrected in half an hour. The error rate has been reduced to 1/5 of 1% – an accuracy almost impossible to achieve with conventional keypunching.

This improvement in accuracy results from the timekeepers' familiarity with the data they are recording.

A regular keypunch operator records what she sees . . . when a timekeeper records it, the data is meaningful. And, instead of a duplicate keypunching for verification, the timekeepers compare the printed data on the completed card (the unit prints as it punches) with the tally sheet.

The advantages of shifting the keypunch function closer to the data source can be seen in how nonstandard or special charges can now be handled.

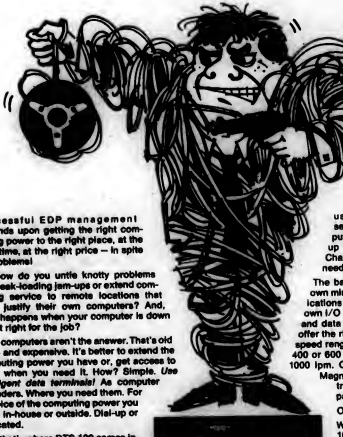
These charges were too complex for the regular keypunchers to record on standard direct labor job cards. A time ticket without pre-punching was formerly required to manually record almost half of all labor transactions.

Because the timekeepers understand how to handle such charges as re-work with standards, nonstandard operations, etc., approximately 80% of all transactions now can be recorded on the standard direct labor job card, expediting processing throughput considerably.

Problems formerly experienced in developing hourly data for payroll and other output reports have virtually disappeared since the new system was installed.

Arthur F. Hird is employed at the Winchester-Western Division of Olin Corp. in New Haven, Conn., as manager of the control systems and general plan administration departments. Prior to joining Olin, he held positions of chief engineer and plant manager.

Bound-up in EDP problems?



Successful EDP management depends upon getting the right computing power to the right place, at the right time, at the right price – in spite of problems!

So, how do you untie knotty problems like peak-loading jam-ups or extend computing service to remote locations that can't justify their own computers? And, what happens when your computer is down or not right for the job?

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Users, Manufacturers Blamed for Slow OCR Growth

By L.S. Kirschner
Special to Computerworld

Optical character recognition (OCR) technology has existed for many years and offers a great potential for eliminating the manual conversion steps common to most data input preparation techniques.

In spite of this potential, the capability for reducing data input costs, and the availability of many machines, OCR has not yet achieved widespread acceptance in the marketplace – fewer than 3% of the computer sites currently have OCR installations.

The growth of OCR has been inhibited by user reluctance to accept OCR as a data input approach, and by a failure of the OCR manufacturers to address the needs of the user.

User Reluctance

Five factors have contributed to the slow rate of acceptance of OCR by the user community.

- High cost – Optical character readers require an extensive capital investment to purchase and install. Extensive redesign of the DP system, modification of input data preparation procedures and retraining of personnel are all required.
- High marketing cost to manufacturers – Early manufacturers, primarily independent companies, lacked sufficient resources to establish an adequate marketing program.

Users required not only indoctrination in the use of OCR, but also considerable technical support from the manufacturers, and such assistance was generally not available.

- Technical limitations – Until recently (1968), manufacturers could not provide OCR machines with sufficient handprint recognition capability.

This capability is necessary to significantly penetrate the direct read mode market (i.e., that mode of operation in which source documents are read directly by the OCR machine), since over 50% of source documents are hand-generated.

- User reservations – Data processing managers, already pressed with burgeoning responsibilities and tight time schedules, hesitated to extend themselves still further to a new kind of system when success is not guaranteed.
- Competing technologies – Keyboard-to-storage systems have provided an attractive alternative.

User's Needs Ignored

Early manufacturers were either unable to build machines geared to the majority of OCR users or did not recognize the needs of these users.

The current generation of OCR machines are high-speed devices typically capable of reading 300 or more char/sec. This is equivalent to the output of approximately 150 keypunch operators.

However, a look at the data input requirements of computer installations reveals that this capability is required in only a small percentage of computer sites.

Manufacturers' Response

The OCR manufacturers are beginning to respond to the needs of the user. Recognition of the large number of small users and the competition of other technologies has led to the introduction of low-cost OCR machines, which are more competitive with keyboard-to-storage systems than earlier OCR machines.

Handprint recognition has become available with the introduction of the IBM 1287 in 1968, and other manufacturers have followed suit.

While these machines can read only tightly constrained handprinted numerics and a few special alpha characters, they have greatly increased the potential for OCR in the direct read mode.

New machines entering the market are benefiting from reduced manufacturing costs due to a combination of marketing and design strategies.

First, the document transport (paper handling mechanism) represents as much as half of the total manufacturing costs. These costs depend directly on document transport speeds.

But high document handling speeds are important only for large-volume applications of OCR, which account for only a small percentage of potential users.

The second factor in reducing manufacturing costs comes from improved techniques for producing the electronic circuitry needed for OCR recognition logic and for the control units of the machines.

Furthermore, many low-cost building blocks for OCR machines are commercially available.

Recognition logic costs are also being reduced by using general-purpose minicomputers programmed for performing recognition. In addition, these minis can be used to replace special-purpose control circuitry.

The price of these minis is also declining rapidly because of the economics being achieved in integrated circuit manufacturing.

OCR suppliers are expected to place greater emphasis on input data preparation as a separable user problem. Their marketing approaches will be geared to solve this problem through greater system and software support, as well as providing required OCR equipment.

Currently available or soon-to-be-announced OCR machines are addressing the need for flexible data input stations combining various technologies in the same input system.

One such system combines OCR with key-to-tape. The OCR subsystem is used in those applications in which the source documents can be read directly, since adequate control exists over their preparation.

Key-to-tape subsystems are used in those applications requiring re-keying of the source documents.

Another system, designed primarily for the bank credit card industry, combines Micr and OCR technologies and optically reads account numbers from credit card invoices, printing them in magnetic ink on the invoices at speeds up to 4,000 card/hour. Micr equipment, which is already possessed by banks, sorts the cards by account numbers and thus eliminates the need for special OCR sorting equipment.

Another trend geared to user needs is the elimination of the distinction between readers of documents and pages.

These examples of equipment and marketing flexibility are making it easier for users to justify an OCR installation, and should stimulate an increase in the number of installations.

L.S. Kirschner is a senior technology analyst with the Auerbach Technology Evaluation Service. He has been responsible for reports in the area of OCR.

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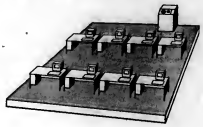

INFOREX

OCR Could Eliminate Data Flow Automation Problem

By Frank Piasta
CW Staff Writer

The development of optical character recognition (OCR) equipment may eliminate one of the major stumbling blocks in the process of automating the flow of data.

Ideally, OCR equipment will read any document and transmit the data to a computer, eliminating any intermediate data preparation.

From the first computers to the present, data has had to go through an intermediate conversion process such as magnetic tape so that it could be machine-readable.

Because this process has depended on a human operator manipulating a keyboard, it has proven time-consuming and expensive.

More significant, perhaps, the transcription process has been the source of a large amount of data errors.

But OCR equipment is not yet a perfect solution to input problems. The machines with a low price have correspondingly low throughput and reading vocabulary usually limited to one font or numerics. The simplicity of the process does, however, enable the units to maintain a relatively low reject rate.

Units with the capability to read an unlimited, or nearly so, number of fonts, usually are very expensive with prices up to $1 million. Typically, these are also the machines with reading rates in the thousands of characters per second.

Heightened Sensitivity

Because of the high reading speed and the complexity of a reading process that allows font flexibility, the expensive machines seem to have a high reject rate from a heightened sensitivity to document condition. Smudges, creased documents, or even poor quality paper can raise havoc with these machines.

Optical character readers can be defined by the input medium that can be accommodated and by the output generated.

The readers, for example, are designed to handle documents that are smaller than page size. The size of most documents typically would be between 3 in. by 3-1/2 in. and 4 in. by 8 in.

Most units in this category are equipped to read small character sets that consist of numerics plus special characters.

Page readers handle a wider range of document sizes including the standard 8-1/2 in. by 11 in. pages. These are often the most versatile in the number of fonts that can be read and in the completeness of the character sets available, but the size of the documents to be handled can present transport problems.

Journal tape readers are designed to use narrow strips of paper variously called adding-machine tapes, listing tapes, journal tapes, tally rolls, or register tapes, as input.

Multifont Capability

Rarely do these readers need the ability to cope with more than a limited set of characters (numerics and special characters) but they frequently have multifont capability.

The simplest of the OCR units is the reader-punch that reads data printed on standard tabulating cards and punches it into the same card.

A type of OCR device that uses an intermediate step between the document and the reader uses microfilm as its means of input. Since the data conversion is performed photographically, errors are not often introduced.

The advantages of high input speeds and compactness of the intermediate storage required might offset the additional process. Devices that have used this method have been expensive, multifont readers.

The bulk of OCR equipment falls into either on-line or off-line categories. The on-line units are computer-compatible and are connected to a channel for direct input.

The off-line devices are usually equipped with a magnetic tape drive that produces 1/2-in., computer-compatible tape.

Font Standardization

The multifont devices represent an effort to overcome one of the most troublesome aspects of OCR, the wide variety of type faces in current use. In order to reduce this problem of unique type styles, a study was conducted by Usascii, under Bems sponsorship, which resulted in the adoption of a standard character set called OCR-A. Originally consisting of upper-case characters only, the standard was later expanded to include lower-case as well.

This standard was not universally accepted, however. During the interval when the Usascii standard was being formulated, the International Standards Organization (ISO) adopted its own font, currently known as OCR-B.

The ISO standard has found its greatest acceptance among European users and manufacturers. Lower-case characters are a later development.

The conflict between OCR-A and OCR-B resolves basically into a font that is primarily machine-oriented versus one that is human-oriented.

The OCR-A font is very stylized, and has caused complaints that the user's customers, for example, have difficulty reading it. The stylization of the font however, is what makes the set useful to the machine. Characters are more easily distinguishable.

OCR-B is the more aesthetically pleasing of the sets. When given a choice, people surveyed have consistently chosen the OCR-B font in preference to the OCR-A.

Stylization, or in this case, the lack of it, is largely responsible for an appearance that more closely approximates a normal print face.

The simplicity of the design, however, is what bothers the machines. Proponents of OCR-A argue that OCR-B, by virtue of its simplicity, is much more difficult for a machine to recognize and consequently results in a higher reject rate.

The existence of lower-case characters in both fonts does indicate the industry has felt the effect of the human element. In normal printed matter, upper case alone is seldom used, so it strikes the reader as somewhat "unnatural."

Editor's Note

The input supplement has been edited by Frank Piasta, who is responsible for the systems/peripherals section of the newspaper.

Piasta was formerly an associate editor for Auerbach reports, a methods programmer for RCA, and a systems programmer for Arthur D. Little Inc. He holds the Certificate in Data Processing.

Long Live Hollerith!

Obituaries for the Keypunch Called Very Premature

By Malcolm L. Stiefel
Special to Computerworld

According to key-to-tape and OCR equipment makers, the Messiah will come when the last keypunch in the world is removed to the Smithsonian. But if you're waiting for that day, bring your lunch, because it's going to be a long wait.

Consider IBM. It takes such matters seriously, and IBM hasn't made many errors in appraising the market. Its feeling is apparently summed up in the recent introduction of the buffered 129 keypunch/verifier.

This device not only answers the threat of key-to-tape units which have made small dents in the keypunch market, but it also responds to other buffered keypunches, such as Univac's. Such an action indicates that IBM is not about to abandon the business.

Many current trade ads reflect the substantial used keypunch market that has been built up over the years. The IBM 024 and the 026 are usually offered, but the newer 029 isn't available. This implies that users of the newer machine are keeping their 029s.

According to one equipment broker, many owners of older keypunches are upgrading to newer keypunches, not to other types of equipment.

On the negative side, many keypunchers are out of work today, but this is a result of the slumbering economy, rather than technological obsolescence.

The keypunch service bureau, whose vitality depends entirely on a healthy demand, seems to be thriving. Many are working 24 hours a day to handle the load, although some of their business may be coming from users who have laid off their own keypunchers.

All of this indicates, in a qualitative way, that keypunching is alive and well and even if the market isn't expanding faster than it once did, it certainly isn't disappearing.

The Long Run

But what of the future? Will the keypunch in 1990 be as rare as clean air? No, it will still be found in substantial numbers, but after a while it will cease to dominate large centralized in-house input generation departments.

Those areas will inevitably go to the cheaper, faster high-volume key-to-tape, key-to-disk, and OCR devices; in some plants such departments will vanish entirely as source data automation equipment becomes less costly and more popular.

The keypunch will remain, though, in batch computer installations, EAM departments, software houses, schools and various administrative offices in small businesses.

Next to higher-level languages, the keypunch is the greatest boon to batch computer programmers ever invented. It's inconceivable that the practice of replacing a card to change a program will ever diminish. It's quick, easy and convenient.

Sure, cards can get lost and large decks are awkward to handle. But the capability to add, delete and modify randomly is an overwhelming advantage in favor of the keypunch.

This property is common to all unit record systems, and it is the key to their widespread use until now. Strictly speaking, any organized unit-record file (with one record per card or one record per document) is logically equivalent to an indexed-sequential file or disk. There are orders of magnitude of difference in speed, obviously, but not in design principles.

Similarly, the data-gathering tape cartridge or punched paper tape is logically equivalent to a sequential file, in the sense that the record of interest must be located sequentially, not randomly, before any changes can be made.

So if a clerk is responsible for maintaining a file, it's simple to look for a card in a deck and note the change on it for subsequent keypunching. Then the fresh card is refiled.

If the file or the traffic is very large, then the method becomes unworkable, but it is then possible to increase the level of automation of the system. This reaches its ultimate when the file is placed on-line and the clerk makes changes from a data terminal.

Of course, the system must also require relatively infrequent computer or EAM processing of the file. One to four times a year is a typical range. Otherwise the cards get chewed up quickly or lost. More frequent processing, especially on a computer, usually calls for tape or disk storage for records.

There is a crossover point in file size somewhere between 10,000 and 100,000 records. In on-line traffic, the cross-over occurs at about 200 to 500 transactions per day. Below these points, unit record files usually make sense. Above these values (the exact point depends on the environment), unit records, and hence keypunches, are in for some real competition.

Since thousands of low-volume and low-traffic applications will continue to exist, the continued supporting use of the keypunch is assured.

It should be noted that one average keypuncher can create or modify more than 350,000 records a year, so a single machine is generally able to support several low-level applications.

Malcolm L. Stiefel is an independent consultant with extensive experience in systems analysis, design and evaluation.

Girls Punch Faster

CHICAGO – One way of decreasing the cost of data input is to increase the productivity of the keypuncher. An English method that is being offered here by Malt Keyboard Dynamics is said to make possible an increase in the output rate up to 30,000 keystroke/hour, with errors held to one/1,000 strokes.

The system relies on novel methods that involve the balancing of the inepteess of the left hand, (the adoption) of schythmic high speed settings with bursts, the development of reading speed and the removal of sources of errors.

1,[illegible] character display (27 lines of 74 characters each) on a 12-inch screen.
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Specialized Equipment Could Reduce Input Expenses

By Ned Chapin
Special to Computerworld

About half the cost of using a computer in the common business, industrial, and governmental applications is incurred in acquiring the input data. No aspect of computer use offers more potential for savings, yet it is the hardest of all places to squeeze out savings. One major reason is the lack of suitable variety of data acquisition equipment.

Each year, individuals and organizations produce, send, receive, and process more than a billion invoices that are readable by man, not by man and machine.

The consequence is the expenditure of hundreds of millions of manhours to translate between these two representations of the same invoice data, and to check the work.

Most of this is sheer waste arising from a lack of suitable data gathering equipment. To change the picture, equipment that can read invoices and is compatible with communications facilities is needed.

This is beyond the present ability of even the most capable OCR equipment because of the variety of formats presently used, and the lack of standardization.

Any equipment that can handle the present diversity is at present too expensive to be widely applicable.

Inexpensive small equipment, perhaps something that acts in major part like communication equipment and handles invoice data like a message in a string format might be a practical answer.

It would leave invoices human-readable, but also make them machine-readable, but in a different area or part of the document just as a part of ABA encoded checks is devoted to magnetic ink characters for machine reading.

Perhaps this requires the development of new compact coding and writing methods compatible with existing line printers.

Each year, people handle billions of pieces of physical goods. Shopping in a supermarket for groceries is one good example, but a similar situation occurs daily in hundreds of thousands of warehouses, tool cribs, and stock rooms.

The problem is in identifying the person, the items, and the amounts to be charged, and then putting them into machine-usable form.

What is needed is a means of making the items of stock and their prices easily self-identifying to some input data-gathering equipment. This is going to require changing the stock's packaging, specially marked by the manufacturer, as well as designing a way to sense the marking.

Every week, each of the more than a million unemployed persons drawing unemployment benefits must again certify he qualifies for benefits.

This is basically person-to-person communication, yet because the data falls mostly into recognizable patterns, organizations want to handle the data with computers. But people generate the data.

What is needed is some equipment easy for an untrained person to operate that yields data in a form readable by man and machine.

Something like a Rand tablet using a superimposed pre-printed form with check-off boxes might be a starting point, but the interactive use of a CRT display is probably both too complex for the people and too costly.

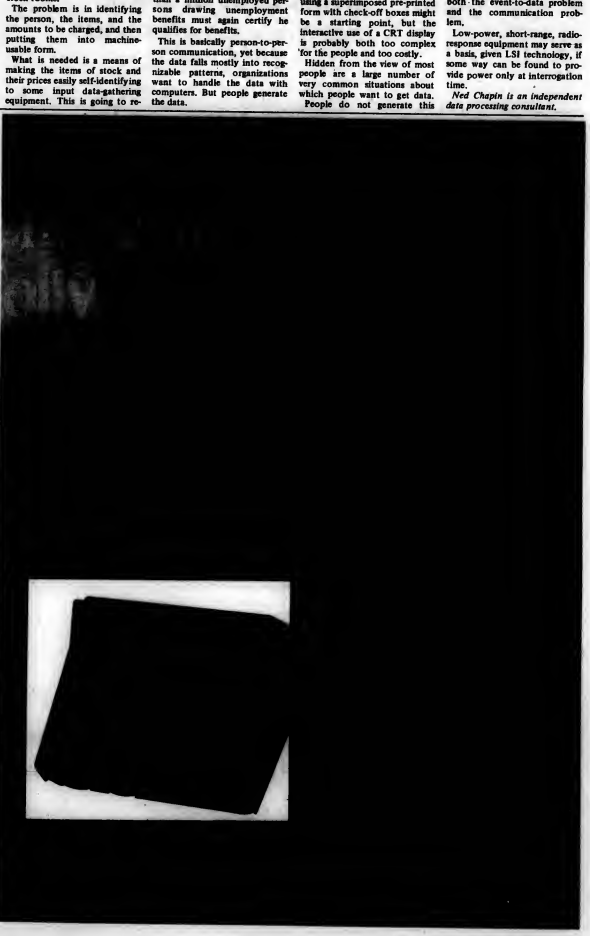
Hidden from the view of most people are a large number of very common situations about which people want to get data.

People do not generate this data, and no requirement exists for having the data initially or sometimes ever, in human-readable form.

Equipment to handle these situations will require meeting both the event-to-data problem and the communication problem.

Low-power, short-range, radio-response equipment may serve as a basis, given LSI technology, if some way can be found to provide power only at interrogation time.

Ned Chapin is an independent data processing consultant.



Front End Units Aid T/S Users

(Continued from Page S/13)

The local installation manager could still keep his confidential data in-house, eliminating any chance that a competitor could gain access.

The increasing tendency to make similar languages available on small and large computer systems will help to reduce programming costs. The local programmers for instance, will be able to check out their programs on their own processor before trying them on the time-sharing system.

The simplicity of the languages and their increased efficiency would also help decrease expenses on the local level.

Another possible source of savings on software could arise from the combination of a group of utility users with similar interests to purchase proprietary software packages.

The high-speed transfer of data could make it practical to retrieve the programs from the central file.

If it has anything to do with Independent Peripherals, it should be in one of our three supplements.

Our February 24th Inputs Supplement

will feature:

- Which user sites can make best use of various keyboard input systems?
- What type of keyboard input system for you?
- What are the future trends in remote batch?
- Keypunches – new life in an old medium.

Our *Independent Peripherals Inputs Supplement* closes Feb. 5. Reserve your advertising space by filling out the coupon below, or contact your local Computerworld representative.

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will feature:

- Which user sites can make best use of bulk memories?
- Can independent suppliers continue to provide savings to computer users?
- The trend to disks.
- What can independents offer besides lower prices?

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Our April 28th Outputs Supplement

will feature:

- Which users can make best use of COM (computer output microfilm)?
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- Is off-line output worth the cost?

Our *Independent Peripherals Outputs Supplement* closes April 9. Reserve your advertising space by filling out the coupon below, or call your local Computerworld representative.

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Many Users Prefer Key-to-Tape to Keypunch Units

By E. Drake Lundell Jr.
CW Staff Writer

Key-to-tape input systems, and particularly shared processor key-to-tape systems, are breaking down users' reluctance to switch from the familiar keypunch and verifier – and most users like the change.

Of all the input methods that have been touted as keypunch replacements, keyboard-to-tape/disk systems presently are finding use in more applications than any other – and their use will grow in the foreseeable future.

At present users are employing more than 28,000 key-to-tape keyboards for data collection and more than 90,000 keyboards will be in use by the end of 1973, according to projections developed by international Data Corp. (IDC)

In addition, a recent CW survey shows that most of the users of key-to-tape equipment are satisfied with the equipment performance, vendor service, and competence of the suppliers' personnel.

No method of data capture is going to push the venerable keypunch off the market, and such highly promoted devices such as OCR will make very little penetration in the next few years.

Reason for Success

The reason for the success of the key-to-tape concept seems relatively simple – a key-to-tape installation can be treated in much the same way as a company's keypunch operation.

At the same time, of course, it is saving the user money in most of the present applications by either increasing throughput or reducing the firm's labor costs.

Quite often the key-to-tape operation is treated as an exact replacement for keypunch installation. They even look familiar – both consisting of large rooms with girls sitting in front of keyboards entering data. Key-to-tape installations are at least quieter.

Similarity Reassuring

To many DP managers, this similarity is reassuring – complete change and resystemization is not necessary when leaving keypunch for key-to-tape as it is when switching to some of the other new data capture methods.

An organization can continue to do business the same way as it has since the introduction of computers practically, and achieve costs savings that are possible with increased capacity and throughput.

Key-to-tape units first were introduced by Mohawk Data Sciences in the middle 60s with its single station data recorder where data from one keyboard was recorded directly onto magnetic tape.

But key-to-tape devices have begun to peak in popularity with the tremendous growth rates of the late 60s trickling down to a mere doubling over the next four years.

Key-to-Disk Systems

The former star on the keypunch replacement horizon is being eclipsed by its logical extension – multiple station key-to-tape devices, sometimes called key-to-disk or shared processor systems.

Basically these units consist of several keyboards hooked up to a single minicomputer or programmed controller that collects the input, verifies it, provides some other functions, and places it on tape or disk for processing.

These systems offer economies of scale. They began being widely installed during 1970, so there is not a very large base of users with experience with the systems to date.

Most of the key-to-tape users, however, are pleased with their equipment.

At the same time, the users are constantly searching for more efficient and cheaper ways to handle their data input operations.

The sharp rise presently predicted for shared processor systems will begin to slow down after 1973 as users turn more to direct input or methods that might be under development at present.

Key-to-Cassetta

The other major competition can come from the low-cost key-to-cassette data entry devices, such as the terminals that were developed by Vistron.

Although users have been put off somewhat by the problems plaguing Vistron, they are still interested in the technique – and the low cost of such units.

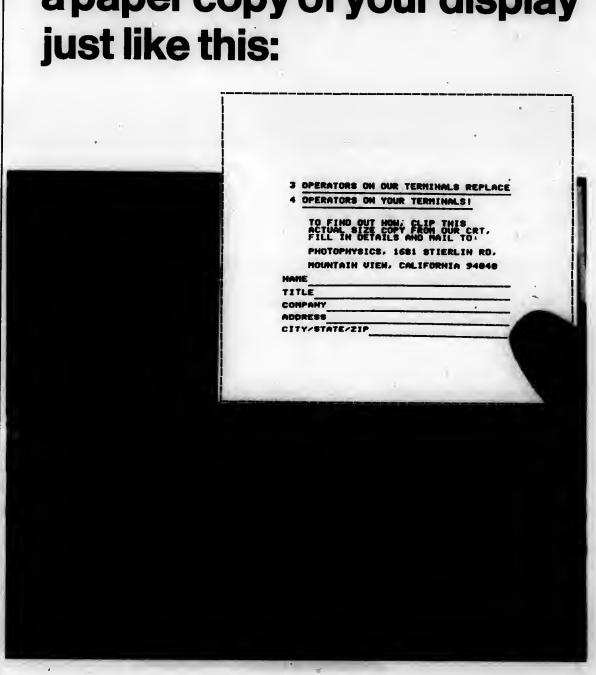
Also, the future will see smaller shared processor systems, which will bring the economic tradeoff between key-to-tape and keypunch down to a lower level.

At present a user has to replace 10 to 12 keypunches to economically operate a shared processor key-to-tape system. In the near future, units will be announced that make it economical for a user with five or six keypunches to install a shared processor system.

The future of the shared processor systems and all key-to-tape devices will hinge on lowering costs and making the systems economical for use with smaller keypunch installation than at present.

The industry seems to be willing to meet the challenge, and the user is more than willing to reap the benefits.

In 5 seconds from your command, a paper copy of your display just like this:



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The computer is no longer an abstract notion in the corporate scheme of things. Yet, to many managers it still remains a modern day enigma. To others, the computer is a means to a new title.

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And since the full impact of the computer has yet to be felt on management operations, it is equally important that a thorough understanding of modern management techniques and objectives exists at all levels of management.

Computerworld is pleased to recommend **Management and the Computer** to its readers as an effective aid in preventing a communications gap between top management and data processing executives.

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Random Notes

No Envelopes Needed With 'Automail II'

WESTPORT, Conn. – IBM OS/360 users can generate individually addressed letters, memos and notices for mailing, with the Automail II package from Hygain Technologies Inc.

Using a file of 32 user-defined mailing lists, and message text punched on cards, Automail produces mailers in Zip Code and/or mail drop sequence.

Automail II operates on any IBM 360/370 which supports PL/1 level F. It requires 128K bytes of memory and a direct access device in addition to card reader and printer. It costs $375, from 85 Whitney St.

Corporate Financial Planning Available on Three T/S Nets

LOS ANGELES – Users can analyze their present financial position and predict the effect of alternate courses of action or changing conditions with Foresight, a time-shared planning service available on the Remote Computing Corp. network on the West Coast, and on Multicomp network in the East. Interactive Data Corp. also provides the service.

Developed by Applied Computer Technology Corp., Foresight is said to be unusual in its flexibility. Users can access disk files as well as input data from terminals, to develop their reports. The files created by Foresight can also be used by other programs.

RCC is at One Whilshire Blvd. here; Multicomp is at 36 Washington St., Wellesley Hills, Mass.; and Interactive Data Corp. is on Totten Pond Road, Waltham, Mass.

Life Insurance Applications Controlled by ISA Package

ATLANTA – Life insurance home office personel can enter and update policy application data through visual display terminals, with the New Business Issue System from Insurance Systems of America Inc.

Issue controls an application from submission through final disposition and provides immediate response to inquiries on the status of pending applications. The system price ranges from $75,000 to $150,000, an ISA spokesman said. The firm is at 12 Perimeter Canter East.

Chain Stores Use Report Package

FORT LEE, N.J. – Clothing store chains can improve their merchandizing and financial management with reports produced by the Retail Apparel Chain Store System (Racss) developed by Data Usage Corp. (DUC).

Written in a common subset of RPG, the 30 programs in Racss can be installed on any 360, IBM System/3, Univac 9000 or RCA Spectra/70.

The complete package costs $5,000 from 2460 Lemoine Ave.

S&Ls Go On-Line in St. Louis

ST. LOUIS, Mo. – Savings and loan associations in this area can have all of their customer accounts handled by an on-line service provided by Financial Data System (FDS). The service is based on the FDS On-Line Financial Package and has been implemented on its 360/40 for local users.

The package includes programs for handling passbook savings, mortgages, certificates of deposit, general ledger and other customer activity. Updating of files is done automatically as new entries are made. FDS is at 6680 Chippewa St.

ANS Cobol Included

HIS Improves T/S System for GE 400s

By Don Leavitt
CW Staff Writer

PHOENIX – GE computer users worried about what software support they will get from Honeywell Information Systems may have a partial answer. The Direct Access Programming System (Daps) and closely related Integrated Data Store (IDS) system for the Series 400 have been enhanced by HIS.

Upgraded software for an older GE series puzzled some industry observers, although continuing support for time-sharing operations had been anticipated when Honeywell and GE merged last summer.

Daps allows Series 400 users to perform remote terminal processing and multiprogramming through an operating system and support program.

IDS is both a data base management system and language which uses Cobol to process data fields.

Daps/70 includes an updated Cobol compiler which is compatible with the highest Ansi standards, HIS said. It also includes operating system improvements.

A user-oriented transaction processing facility has been built into the multiprogramming operating system and integrated with a queue management system. Under transaction processing, work is submitted to the system in units corresponding to events, rather than through job control cards or commands, the company said.

Specific areas of performance improvement under Daps/70 are said to include changes to the linkage editor to provide faster initiation of object programs and changes to permit increased I/O queuing for printer and punch peripherals.

Daps/70 includes changes to the IDS system to allow simultaneous update operations, prewriteving and disk queuing features, an HIS source said. For multichannel disk users, IDS has been modified for maximum simultaneous channel use.

New verbs have been added to the IDS language to ease the structuring, storage and retrieval of information from the data bases, HIS concluded.

Data General Cross Assemblers Use 360s for Development Work

SOUTHBOROUGH, Mass. – Users can develop programs for the Nova series of minicomputers on IBM 360/370, Univac 1108 or CDC 6600 mainframes, with three cross-assembler packages from Data General Corp.

The packages are said to be completely compatible, accepting source programs written in the Nova relocatable extended assembler language, without modification. By shifting the assembly process to an on-site mainframe, the user can take advantage of the faster I/O devices on the larger systems.

Used in a time-sharing environment, the cross-assemblers would allow the user to free his in-house Nova for production processing.

The packages provide only assembly capabilities so the debugging phase of program development still has to be done on the Novs.

Cross-assembler and debugging capabilities for Nova programs are available from other vendors. Novasm and Nomac, from Comptek Research, Buffalo, N.Y., provide for assembly and operation of Nova programs on a 360 or on a DEC PDP-10. Applied Data Research provides this type of program development support in time-sharing services called IMP and Mimic.

The Data General packages are written in Fortran IV and the source programs of the cross-assemblers are available on magnetic tape for $45.

I/O Problem Shows Weakness of APL System

By Don Leavitt
CW Staff Writer

PROVIDENCE, R.I. – An I/O error that recently made APL workspaces inaccessible to some users at Brown University illustrates one of the problems with the APL system. The new procedure now being used to avoid such problems in the future illustrate the value of good planning at any installation.

APL users have to be organized into self-contained workspaces, generally 32K bytes in size, in which the user has his program and all the data he wants to use with that coding. These are normally stored on a disk library and brought into core under control of a special APL directory. Without the directory, the workspaces cannot be located and accessed.

At Brown, part of the directory was garbled, and in some still unexplained way, the second copy of the directory, normally used for backup, was also unusable. Thus the affected users could not get at their workspaces.

Since then, Brown has been dumping all new and updated workspaces including the appropriate directories, onto tape each morning before APL is brought up for users. The daily tapes are kept for two weeks and the weekly tapes are to be kept for several months.

The system provides retrieval of specific workspaces from these dump tapes. In this way, Brown said, users will be able to recreate their workspaces as they existed in the previous updating, even if another disk or system failure occurs.

OS Handling of Unblocked Data Solved by JCL Change

NEW YORK – User who have had trouble with unblocked files in an OS/360 MVT environment may find the solution to their problem in the January issue of *Thruput* from the Association of Computer Programmers and Analysts.

The "Bug of the Month" column outlines the problem of trying to read unblocked data sets from Sysin, while operating under older versions of OS/MVT.

The major differences in these routines lie in the blocking factor used to write the Sysin data set to the direct access data set called CPP.

Although the user considered his data set as unblocked, the reader/interpreter has in fact blocked it on operator instructions on the CPP in order to speed the I/O handling. If in Cobol coding the programmer has defined the block as containing one record, and the CPP has been defined so that blocks are, for example, 40 records long, the program will "bomb."

This can be overcome, the column notes, by defining the data set, in the Cobol FD, as containing zero records. The next step depends on whether the user wants to save core or execution time. By showing **BLKSIZE=80**, in the JCL data definition statement, the user can override previously defined CPP blocksize.

If space is no object, the user accepts the reader/interpreter blocking factor as the operator originally defined it.

This is the situation that can cause problems, the author said.

Here again, insertion of a **BLKSIZE** on a data definition statement in JCL can correct the situation, revising the orginally specified blocksize.

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Package Controls Production

CHICAGO – Managers responsible for production operations can keep posted on current information with the Product Formulation, Accounting and Cost System (Profacts), available from Fortex Data Corp.

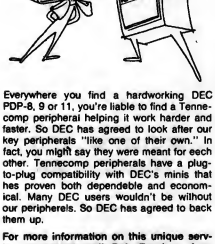
The maintenance cycle of Profacts provides users with the standard product composition for each finished and intermediate product. A current cost list for raw materials is maintained, and the manufacturing cost, including labor, material, and overhead, is generated for each product.

Fluctuations in product costs are monitored to facilitate an accurate evaluation of product mix and pricing policy. 'Where Used' reporting of raw materials and intermediate products is available for analysis of material utilization and the impact of projected material substitutions.

In the production cycle of Profacts, material requirements and manufacturing instructions are prepared for requested production levels of finished products. Based on the production requests for all products, quantity requirements for raw materials and intermediate products are consolidated and reported for a given cycle.

Profacts is written in Cobol, and is designed for 64K Model 30 or larger 360, using DOS. A minimum of four tape drives and two disk drives are required. The system costs $7,800, from 230 North Michigan Ave.

DEC now provides national service on key Tennecomp peripherals.



Everywhere you find a hardworking DEC PDP-8, 9 or 11, you're liable to find a Tennecomp peripheral helping it work harder and faster. So DEC has agreed to look after our key peripherals "like one of their own." In fact, you might say they were meant for each other. Tennecomp peripherals have a plug-to-plug compatibility with DEC's minis that has proven both dependeble and economical. Many DEC users wouldn't be without our peripherels. So DEC has agreed to back them up.

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Tymshare Adds Service

Users 'Retrieve' Data Interactively

By Don Leavitt
CW Staff Writer

PALO ALTO, Calif. – Users with batch-oriented installations can have interactive access to their data bases, by loading them onto the Tymshare network and working with the Retrieve information retrieval language.

In most cases, the data bank can be developed for time-sharing purposes at the same time that data is prepared for batch operations. Thus the bases for the two operations can be kept identical, Tymshare said.

While providing immediate access, Retrieve is said to make handling of data extremely easy, even for non-programmers. There are 17 commands with which the user can obtain information, manipulate it and format the output.

English language commands can be used, the company said, to print records that satisfy certain conditions, such as those occurring within a particular time period or within specified minimum and maximum limits.

Information can be sorted by Retrieve in order to produce reports in various sequences. Data can also be subjected to arithmetic functions to determine factors or ratios not directly available, Tymshare said.

Data fields can be updated or revised by Retrieve through automatic editing which insures the accuracy of entries. Any errors such as incorrect data type or field length are indicated.

The interactive nature of Retrieve allows the user to interrupt a command at any time, so that he maintains complete control over all processing steps.

Retrieve is available under two payment plans. With one, there is an $80/mo minimum and connect time is billed at $16/hr. With the other for larger users, there is a $390/mo minimum and connect time costs $13/hr. In either case, CPU time costs 4 cent/sec and mass storage is available for $1/mo for each 1K characters. Tymshare is at 525 University Ave.

Canadian Service Uses OCR Units, Converts Manual Files to Tape

DON MILLS, Ontario – Canadian users faced with converting large manual files to computer-accessible format can use a microfilm-based service available from International Computer Optics (ICO).

Any printed material, typewritten text or special symbols can be recognized, ICO said. The system learns fonts directly from the data being scanned, including material with intermixed fonts and point sizes.

ICO converts the user's source documents to microfilm. The films then serve as input, with either 7- or 9-channel magnetic tape produced as output.

The stored microfilm records at ICO are available to the user and serve as excellent back-up documentation, a spokesman said.

Cost of the service depends on volume and quality of original documents. It is available at four ICO centers across Canada or from 133 Wynford Drive.

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CRTs Check NC Tapes, Electronic Circuits

RALEIGH, N.C. – Users of the Corning 904 CRT terminal can display the results of electronic circuit analysis with a package developed by Corning Data Systems. Available on the GE and Compu-time time-sharing systems, the Ecaplot programs cover both ac and dc network analysis and dynamic simulation.

Other Corning-supplied 904 software available on the GE system provides rapid verification of numerical control (NC) tapes.

INTERNATIONAL DATA CORPORATION
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This definitive study will provide the necessary impetus to enable the top ranking printing and publishing industry to benefit from new applications of DP technology in processing and distributing data, and will be of value to date processing equipment manufacturers in their planning programs.

Inquiries regarding this study should be directed to:

IDC International Data Corporation
60 Austin Street
Newtonville, Massachusetts 02160

IDC is the leading market data gathering, research, and consulting firm in the computer industry.

Bits and Pieces

Mini Prices Cut 40% By Texas Instruments

HOUSTON – Texas Instruments has reduced prices on two models of industrial control computers by 40%. The Model 960, featuring hardware and software to adapt it to an industrial environment, was cut from $14,500 to $8,450.

The Model 980, a 16-bit mini that can be used for scientific data processing, communications systems and real-time control applications has been reduced from $16,700 to $9,580. The 980 price includes 4K of memory, and hardware multiply/divide capability.

Forms Cutter Trims EDP Printout To OCR Turnaround Documents

GARDEN CITY, N.Y. – The Permac Boewe 302 forms cutter can be used to cut computer printout pages into sizes suitable for input to OCR readers. Produced by American Permac, Inc., the machine can be used to prepare turnaround documents, including multiple part sets. It can also handle forms bursting applications. A center cutting knife is available to separate documents vertically.

The 302 is priced at $4,025 on a 30-to 45-day schedule from Ona Commercial Ave.

Pulsecom Buffered Teleprinter Designed for Dumping CRT Data

ALEXANDRIA, Va. – A fully buffered teleprinter from Pulse Communications, Inc. is designed for quick receipt of information from CRT units.

The Data Storage Unit is made up of a teleprinter and the Pulsecom Teleprinter Buffer unit which will hold up to 4,000 characters of information.

The unit is designed to permit users of CRT displays to transfer the contents of the CRT into the printer at high speed, so the CRT can be used for other purposes.

The price of the complete teleprinter and buffer is about $1,500. The buffer alone is available at a price of $750. The first units will be available in the spring of 1971.

Multiple Film Sizes Developed By Processor in Lighted Room

LOS ANGELES – The Model 5010 Film Processor from information International features the ability to process 105 mm, 3-1/4 in., 70 mm, 35 mm, and 16 mm film in a completely lighted room.

Designed to be used with the output of COM systems, the device is of stainless steel or plastic construction and has a transport speed that can be varied from 12 to 25 ft/min, depending on film used. The firm is at 12435 W. Olympic Blvd.

Small Tape Users Can Now Rent Tape Cleaning, Evaluating Units

BURLINGTON, Mass. – The user who felt that his needs were too small to justify the purchase of tape cleaning systems can now rent the equipment. Computer Link Corp. will supply a tape cleaner/rewinder for $60/mo plus costs of supplies. This allows for the cleaning of one hundred twenty 2,400-ft reels. Additional tapes cost 25 cents each.

The firm also offers a cleaner/evaluator at $300/mo, plus supplies. If more than 150 tapes are handled, a charge of $1 each is added. The equipment is available on a month-to-month rental from 14 Cambridge St.

Medium 360s Get Add-On Memories

By Frank Piasta
CW Staff Writer

SAN FRANCISCO – Users of IBM models 30, 40 and 50 can save 15% to 34% on the cost of increasing their storage capacities by adding plug-in memories from Itel Computer Leasing.

Since memory expansion units are not available from IBM for these 360 models, users who want to upgrade with IBM storage have to change processors.

The Itel memory is said to be the first add-on semiconductor memory designed to enhance main memory for these models.

The memory is the semiconductor RAM (Random Access Memory) units built by Advanced Memory Systems. Itel is the exclusive supplier of the RAM units.

A feature that could make maintenance simpler, and help resolve conflicts in multimanufacturer sites is the ability of the RAM memory to be tested off-line.

Savings to users could be considerable. While not releasing any dollar figures, Itel said that the rental charge for a RAM memory would be approximately 85% of that for an IBM memory expansion. Based on published IBM prices, the increment of $1,200/mo between 360/30 models E (32K) and F (64K) would cost about $1,020/mo from Itel.

Itel told CW the purchase price of the above increment is $34,300. This contrasts with $52,790 for the IBM stepup.

First deliveries are scheduled for June 15 from 1 Bush St.

OCR Backs Up Micr Handling

RESTON, Va. – Primarily intended as a backup unit for processing Micr-encoded documents the OCR-71 Optical Check Reader from Optical Recognition Systems Inc. can handle multiple fonts and up to three lines of data.

An off-line unit, the OCR-71 is equipped with magnetic tape output and includes a keyboard to allow an operator to insert data that is not machine readable.

Reading rate on the machine is 600 char/sec. The document handling speed is 400/min for check-sized documents, 600/min for utility company stubs. A 20-column line printer is also included in the system.

The basic model of the OCR-71, equipped to read one line of E13-B data, is priced at $85,000. First deliveries are scheduled for April 1, 1971, from 1928 Issac Newton Sq. West.

CRT Replaces IBM 2848/2260

HUNTINGTON, Conn. – A system designed as a direct replacement for an IBM 2848/2260, the Mark series CRT terminal from Aids Associates, promises users savings up to 49% compared to the IBM devices.

The Aids system is said to be hardware- and software-compatible with the IBM devices and can be used in either stand-alone or cluster configurations.

The terminal is equipped with a 12-in. screen with a capacity of up to twenty-four 80-character lines. The cursor can be controlled by the CPU.

Prices for the basic CRT, to replace both the IBM 2248 and 2260, range from $4,295 to $4,795. A typical four-terminal cluster is priced at $18,175, 49% under the IBM price of $35,400.

The firm is at 30 Huntington St.

Lightweight Keyboard/Hand-Held Scanner Provides Input to Data Collection System

DAYTON, Ohio – A source data collection system from Monarch Marking Systems, a subsidiary of Pitney-Bowes, can use a lightweight keyboard device or a hand-held bar-code reader as a source of input.

The Monarch System 2100 is designed to be used in such applications as store and warehouse inventory and recording procedures, and is made up of four components, the 2-1/2 lb keyboard, the cassette recorder, a reader/transmitter, and a receiver/recorder.

The keyboard unit can be supplemented with the hand-held bar-code reader. The unit is equipped with a standard adding-machine pad and can include an optional strip printer. It is connected to the cassette recorder/battery unit by cable.

The reader/transmitter is used to handle data from the cassette over telephone lines. A Bell data set is used with a transmission rate of 120 char/sec.

The receiver/converter can accommodate both cassette and datasset input, converts the data and writes it on IBM-compatible 1/2 in. tape. The receiver/converter can also be used to search either the cassette or 1/2 in. tape for a particular record, and display it on a Nixie tube console display.

The price of the non-printing keyboard/recorder/battery unit is $895, equipped with a strip printer it is $1,100. The reader/transmitter is priced at $1,100 and the receiver/converter at $16,000.

Disk Uses Tape I/O

SUNNYVALE, Calif. – Users of PDP-8 minicomputers with DEC tape storage can now add the higher speed and capacity of a cartridge disk without reprogramming with the 3100 series disk systems from System Industries.

A single-disk configuration, which will store 838,000 words of data, is priced at $10,400.

Field service support for all System Industries Storage Systems is provided by Sorbus of MAI. The firm is at 535 Del Rey Avenue.

Communications Line Faults Logged by Mini-Based Unit

WEST LOS ANGELES, Calif. – A mini-based system that can log faults in a communications network has been developed by Proprietary Software Systems, a subsidiary of Image Enterprises.

The system is designed to interface with such base fault monitoring systems as the Collins FA102, Collins FA201, Pulsecom Datalok 3, and others.

The system prints out alarm information that is detected by the monitoring system on a Teletype 33 ASR. The system stores a master record of current faults in the 4K 8-bit word Computer Automation minicomputer incorporated into the system.

In case of an overload, where memory capacity is exceeded, the excess faults are printed out and punched into paper tape for later processing.

A basic system, including the processor, teletypewriter, and a digital time clock, as well as the necessary interfaces, is priced at approximately $24,000. Delivery is 90 days from 11607 West Pico Blvd.

DEC PDP-15 Floating Point Option Is Two Times as Fast as Software

MAYNARD, Mass. – A floating point hardware option for the DEC PDP-15 is said to perform arithmetic operations in less than one-tenth the time previously required by software routines.

The unit, designated the FP15, is designed for use with all PDP-15s doing Fortran programs, batch processing, or real-time analysis and control.

The FP15 option is a third processor that is interfaced directly to the PDP-15 memory bus.

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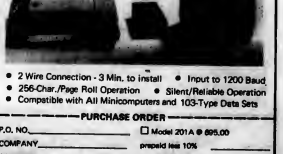

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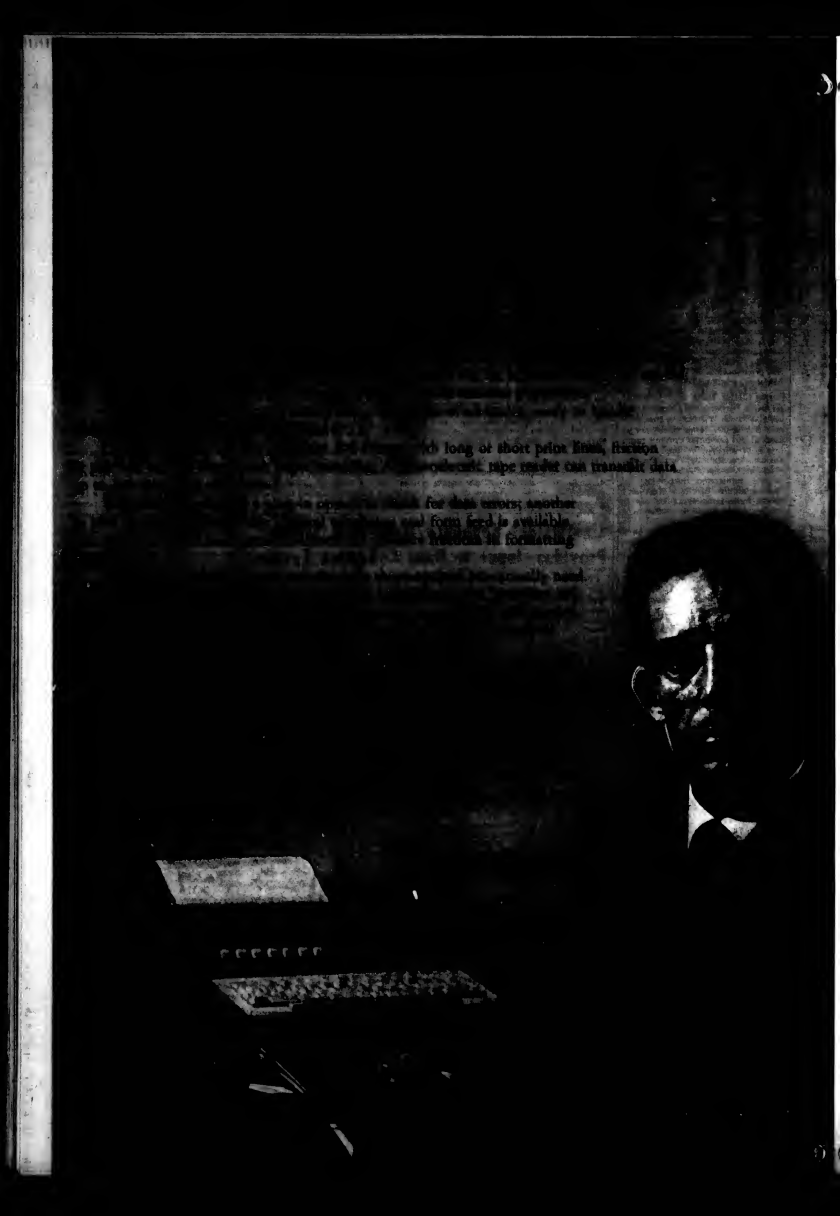

S/Com-70 Handles Fiche, 16mm

ELMSFORD, N.Y. – Two low-cost COM units from Sequential Information Systems Inc. are available in models for microfiche and 16mm films. The S/Com-70 units are available in both stand-alone and on-line configurations.

The units use a solid-state light generating technique, which is claimed by the company to be superior to many higher priced COMs.

The S/Com-70F microfiche system features a high performance drive for handling 105mm film. Priced at $39,850, the Model 1 operates on-line to an IBM 360 Model 25 and up, connecting directly to either the selector or multiplexer.

The S/Com-70F Model 2, at $42,850 uses an IBM-compatible tape format and operates off-line to a built-in 9-track, 800 bit/in. read-only tape transport with a speed of 37-1/2 in./sec.

The S/Com-70R is a 16mm camera equipped version of the same machine. The on-line Model 1 is priced at $32,850, while the off-line Model 2 carries a price of $35,850.

The S/Com-70F prints at the rate of 15,000 132-character line/min, and uses a 64-cherecter set to receive data in Ebcdic.

The firm's current financiel problems are being resolved, e company spokesman said, end should not adversely affect customers.

First deliveres are scheduled for Mey, 1971 from 249 North Saw Mill River Road.

Memory Cuts Varian User's Cost

NEWTON, Mass. – Varian users can save up to 40% on memory prices by buying a 620/i or 622/i minicomputer without core and obtaining the memory from Cambridge Memories, Inc. (CMI).

The Expandacore 620 is available from CMI in 4K increments up to 32K. The add-on memory can also be used to increase the capacity of a memory-equipped Varian mini to 32K.

The Expandacore 620 has a cycle time of 1.8 µsec, and an access time of 750 nsec, equal to the original memory.

The memory is available in word lengths of 16 bits for the 620/i and 18 bits for the 622/i.

The cost of the 4K 16-bit word memory unit is $3,750. Each additional 4K costs $2,450. The 18-bit word versions are priced at $3,950 and $2,650. The units are available on 30-day delivery from 285 Newtonville Ave.

Portable Teleprinter Has Switchable Speeds

DOVER, N.J. – A portable thermal teleprinter from Data Access Systems (DAS) is intended for desk-top use in time-sharing and communications applications.

The Model 720 can be equipped with either a DAA, built-in acoustic coupler, or both in order to operate at switched speeds of 10, 15 or 30 char/sec. An optional version operates at 40 char/sec.

The unit is completely teletypewriter-compatible with an optional attachment of a paper tape reader and punch available.

The printer uses an 80-character print line and is virtually silent. The upper case Ascii character set is standard, with lower case available as an extra-cost option.

The unit is also available as the 721, a receive-only version for use with video displays.

The basic 720 printer is priced at $3,395. The paper tape reader and punch, rated at 30 char/sec, is priced at $1,595.

The receive-only unit is priced at $2,480. Delivery is from stock from 503 Route 10.

S/3 Gets Help

MINNEAPOLIS – Kapko Inc. has a line of accessories for the IBM System/3 that includes work organizers, a tub file, trays for the 96-column card and a work organizer for the data recorder. The firm can be reached through Box 16207.

Cover Reduces Noise

LOS ANGELES – Van San Associatea has developed an improved Soundoff Dampener designed for use with the IBM MT/ST.

The firm is at 32 So. San Gabriel Blvd.

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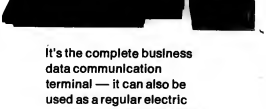

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Three Dial-Up Speeds

Various Used for T/S Error Checking

By Don Leavitt
CW Staff Writer

PALO ALTO, Calif. – Tymshare Inc. is reconfiguring its time-sharing network using multiplexers combined with specially modified Varian 620/i minicomputers, to provide users with "error-free" access to a battery of 19 XDS-940 central processors here.

Tymnet is a nationwide network of dedicated Bell System facilities enhanced by Tymshare-designed and built multiplexer/minis called Tymsats. The remote minis and similar equipment at the Tymshare computer center verify transmissions so that invalid data never reaches the main processing units.

The system can accommodate a range of user terminals of varying transmission speeds via the same phone line. Other time-sharing systems require different lines for 10, 15 or 30 char/sec transmission, Tymshare said.

Internally the Tymnet system is able to reroute message transmissions in case of line breaks or other malfunctions. It also includes automatic assignment of messages to the next available processor, to balance the load.

For users who need access to a common data base from multiple points, Tymnet has a dedicated XDS-940 central processor reached through a common in-Wats number from anywhere in the country. Normal access to Tymnet facilities is through a local call to a Tymsat unit.

Communications

AT&T Report Shows Few DAAs Used

WASHINGTON, D.C. – Some 2,100 data access arrangements were supplied to non-Bell data users by local AT&T operating companies in the 22 months ending last Nov. 1.

The figures were revealed in an interconnection report filed with the Federal Communications Commission, by AT&T. The report listed 1,547 actual DAAs, with only 558 automatic units installed.

The access arrangements allow for the direct electrical connection of user-provided data equipment to the dial-up telephone network the DAAs are an outgrowth of the Carterfone decision which allowed such interconnection.

FCC Split Asked By Congressman

By Alan Drattel
CW Washington Bureau

WASHINGTON, D.C. – Three bills that would abolish the Federal Communications Commission and break up its activities into different commissions and agencies have been reintroduced by Rep. John Dingell (D-Mich.)

Like similar ones the legislator introduced previously, the outlook for the new bills is dim.

They have been referred to the Committee on Interstate and Foreign Commerce which in the previous Congress failed to hold public hearings. A committee spokesman told CW that this "is not the type of legislation we expect to hold early hearings on."

An aide to Dingell said he was unhappy with the FCC's control of common carrier fees and practices. An official at the FCC declined comment on the bills.

DAAs Clarified

AT&T Data Access Arrangement (DAA) devices will continue to be designated as CDT, CBS and CBT by users. An AT&T spokesman told CW that the 1000 series numbering for the DAA [CW, Jan. 13] is primarily for Bell System internal use.

Hawaiians Plan TWX-Type Net

NEW YORK – Western Union of Hawaii Inc. plans to provide island data users with direct dialed teleprinter-to-teleprinter facilities over which users can both transmit and receive printed communications. If a tariff filed recently with the state Public Utilities Commission is approved, the Switched Data Exchange Service (SDES) could be operational within the state by late this year.

The company later expects to interconnect the local service with overseas communications carriers, so that Hawaiian subscribers can transmit and receive printed messages to and from points outside the state including the U.S. mainland.

Comparable to TWX and Telex service, the Hawaiian service could include several hundred on Oahu, Hawaii, Maui and Kauai by the end of its third year of operation, the company said. At present, private and dial-up data facilities are available, from local telephone companies, between the islands and the U.S. mainland, a source told CW.

The proposed service will make possible movement of printed data and facilitate "automated data processing and inquiry/retrieval techniques," Western Union of Hawaii told the commission. The service will close a gap that presently exists in communications now being offered in the state, the carrier said.

If favorable action is taken by the Public Utilities Commission, the service could be initiated as early as October of this year, the company said.

If your university comp center offers just batch, talk to little Bowdoin about their big computer.

As Maine goes, so goes the nation.

Bowdoin knows that batch processing is efficient for the computer. And that timesharing is efficient for the user. With their new PDP-10, Bowdoin gets both at the same time. No need for outside timesharing or big monthly fees for who knows how many terminals scattered all over the place.

Matter of fact, you might be surprised where the terminals are right on your own campus. Or how many. Check engineering, physics, biology. Try the psychology and economics departments. The hush hush projects.

They could be everywhere. And at $1000 a month each for service, the cost adds up.

Ultimately, it's cost and performance that convert comp centers to PDP-10s. For the service fee on 20 timesharing terminals, a college could own a PDP-10. And get batch and real-time processing for free.

California has several universities that think the way Maine does. And Texas and Michigan and. . . . Isn't it worth a call to find out if a multi-language, timesharing, batch processing, real-time, money-saving PDP-10 is right for your comp center?

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Computer Plays Many Roles In Library, Journalism Courses

ANN ARBOR, Mich. – The fields of journalism and library science at the University of Michigan are gaining more student converts because of the use of computers in these courses.

Students in these courses were among the more than 3,000 here last year who used data processing in connection with 168 courses in 33 departments.

"Most students feel the computerized course is an improvement over conventional instruction," according to Prof. Robert L. Bishop, who designed and introduced the computer-assisted instruction program in the journalism department. His first CAI class had only one student transfer out while 10 asked to transfer in.

Nine computer exercises covering the fundamentals of clear, accurate writing consists of specific writing assignments which the computer was programmed to examine.

For example, details for the 1960 Kennedy-Nixon debates are fed into the computer and students are shown a film of the debates. They prepare a news story on the debates which they feed into the computer by teletypewriter or punch card.

The computer checks their story for completeness, accuracy and readability by searching for key words and phrases. The computer also corrects punctuation and cumbersome sentences.

The computer's comments are then printed on a sheet the student may keep.

Bishop said the computer allowed him to teach more students and to have more individual contact with them.

Another course offered last semester to graduate students, library science, featured the computer in the role of library patron.

Students as reference librarians had to question the computer in detail to ascertain the kind of reference work it wanted and then told the computer what work they thought would best suit its needs.

The computer then told the students if they had selected the right book. Students went into the field to find the kind of dialogue that takes place between reference librarians and library patrons.

Drawn from this material and programmed into the computer were 30 of the best librarian-patron interviews, according to Thomas P. Slavens, associate professor of library science and director of the CAI course.

"The computer allows us to simulate actual reference situations and thus nearly approximates professional experience," Slavens said.

In the library science course the students could choose between a wholly computerized form as well as the traditional classroom setting with the computer merely assisting the professor.

Colorado Schools Plan To Spend $2 Million On DP for This Year

DENVER – The Colorado public schools expect to spend between $1.8 million and $2 million for data processing this year.

The director of the information systems and certification unit in the Department of Education, Robert Little, said that a recent survey conducted by the department showed the expenditure will be concentrated primarily in urban areas.

Only 30 of Colorado's 181 school districts, according to Little, reported any use of DP. The 30 districts, however, account for 75% of the state's public school enrollment.

Honeywell Institute Gets Tuition Financing Plan

WELLESLEY HILLS, Mass. – An agreement offering tuition assistance to students of the Honeywell Institute of Information Sciences has been signed by HIIS and the General Electric Credit Corp., according to Honeywell.

Roy Zabierek, national director of the Honeywell Institutes, said the agreement applies to all present and future Institute locations.

"In this period of extremely tight money many students qualified to attend the Institutes are unable to pay the tuition. Our agreement with General Electric Credit Corp. will overcome this problem by offering any student at any location a ready source of financing."

COMPUTERWORLD

education

Roosevelt Establishes DP Training Program

CW Midwest Bureau

CHICAGO – Roosevelt University college of continuing education, has announced a computer training program that will allow a student to obtain college credits.

In offering the course, Roosevelt is recruiting the professional seeking instruction in specific applications and the business executive wanting a better understanding of computer concepts as well as the person wanting to begin from scratch in the technology.

Enrollment at Roosevelt's computer courses does not demand previous education or academic attainment of any specific qualifying level, but college credits are only given to those students enrolled in the bachelor of general studies program and the computer technology credit certificate program for which an applicant must receive university approval prior to admission.

Divided into two curricula of undergraduate and professional levels, the courses employ a variety of computer systems for the instruction. The course is taught in the university computer center.

Languages taught in the course are Cobol, Honeywell Cobol, Basic Assembly and Fortran in the undergraduate course and APL in the professional.

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4th ADP Symposium Set

BOSTON – Intergovernmental use of "national computer resources" will be discussed at a day-long symposium conducted by the Federal ADP Council of New England, under the sponsorship of the Federal Executive Board.

"Interaction," the council's fourth annual symposium on ADP, will be held March 10 at the Sheraton-Boston Hotel, in the Prudential Center.

Topics ranging from standardization of computing equipment to the economics of cooperation will be examined.

Dr. Herbert R.J. Grosch, Senior Research Fellow at the National Bureau of Standards' Center for Computer Science and Technology, will keynote a luncheon gathering. Grosch has been an outspoken advocate of standardization in all aspects of data processing.

The seminar will address such questions as

- Will there even be one, giant, federally operated data bank?
- Will the demand for computer specialists increase or decline?
- Can federal, state, and local officials really cooperate?
- Will the system need new technology?

Although aimed primarily at government users, the conference is open to anyone. Cost for registration and luncheon is $20.

For more information, contact Thomas T. Donovan, Air Force Computer Operations, Hanscom Field, Bedford, Mass. 01730.

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Calendar

March 1-3, Pasadena, Calif. – 1st International Symposium on Fault-Tolerant Computing. Contact: Dr. Francis P. Mathur, Secretary, IEEE Technical Committee on Fault-Tolerant Computing, Jet Propulsion Laboratory, Calif. Institute of Technology, Oak Grove Drive, Pasadena, Calif. 91103

March 1-3, Miami – Spring membership meeting of the DPSA. Contact: Data Processing Supplies Association, 116 Summer St., Stamford, Conn. 06905.

March 5-12, Puerto Rico – National Business Forms Association annual board of directors meeting and association affairs conference. Contact: NBFA, 300 N. Lee St., Alexandria, Va. 22209.

March 9-11, Tulsa, Okla. – Southwest Business Equipment Show. Contact: Southwest's Best, A.O. Oyler, Box 141, Tulsa, Okla. 74102.

March 9-13, Basel, Switzerland – Inel 71, the 5th International Exhibition of Industrial Electronics. Contact: Sekretariat Inel 71, CH-4000, Basel 21, Switzerland.

March 10-12, Tampa, Fla. – 4th annual meeting of the Simulation Symposium. Contact: Annual Simulation Symposium, P.O. Box 1155, Tampa, Fla. 33601.

March 11-13, San Diego, Calif. – 1st annual meeting of Comtec (Computer Micrographics Technology user's group). Contact: Virg DeVine, Xerox Data Systems, 701 South Aviation Blvd., El Segundo, Calif. 90245.

AMA to Consider Cost/Technology

NEW YORK – The American Management Association (AMA) has completed plans for its 17th Annual Systems Management Conference on the theme of "The EDP Cost/Technology Confrontation," to be held March 8-10 at the Americana Hotel here.

Further information may be obtained from AMA's Conference Registrar in New York City.

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February 24, 1971

CI Notes

How Independent Market?

It appears that a market is growing for an innovative firm that would offer a plug-to-plug compatible tape and disk drives to Honeywell users.

One large Honeywell user (153 tape drives) said he would be interested in studying the economic benefits of a replacement program, but could not find any users with independent equipment or a supplier that would sell it to him.

While certainly not as large as the IBM replacement market, the Honeywell-GE market is now number two.

Intel, Fairchild Camera Sign Cross-Licensing Agreement

MOUNTAIN VIEW, Calif.,– Fairchild Camera & Instrument Corp. and Intel Corp. have signed a patent cross-licensing agreement covering semiconductor technology.

Terms call for Intel to pay Fairchild an undisclosed sum for utilization of Fairchild's basic integrated circuit patents, including the planar process. Fairchild may utilize Intel's integrated circuit and semiconductor memory patents.

The cross-license from Intel permits Fairchild to produce Intel's 1102 circuit, an MOS random-access memory for computer applications.

Adapso Asks Credit Card Rulings

WASHINGTON, D.C. – Adapso's response to the proposed truth-in-regulation rule on credit card billing practices presented to the Federal Trade Commission included requests on two specific issues.

The organization asked that the industry be granted a period of time not less than a year to allow modification of EDP systems and programs and debugging operations, in order to comply with any new requirements.

Adapso requested that responsibility for compliance with the proposed rule remain clearly with the organization furnishing the service, not the EDP supplier.

Supershorts

An agreement with Terminal Equipment Corp., Pompton Lakes, N.J., was signed by Savin Business Machines Corp., Valhalla, N.Y., for the purchase of Tycom input-output devices utilizing the IBM Selectric typewriters for time-sharing, communications and information transfer applications.

– – –

Transamerica Computer Co., San Francisco, and Data Instruments, Sepulveda, Calif., have signed an agreement whereby Transamerica will purchase up to $4.5 million of Data Instruments' "Dataplex" systems for subsequent lease to Data Instrument customers. Data Instruments issued to Transamerica Computer warrants to purchase 125,000 shares of Data Instruments stock at $7.13 per share over a five-year period.

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Interdata, Inc. has selected Nordisk Elektronik as its sole distributor in Sweden and Denmark. The agreement permits Nordisk to sell all Interdata products including the models 1, 4 and 5 computers as well as its full line of peripheral equipment.

– – –

Replacement of Cores in Sight

Semiconductor Memory Future Shapes Up

By Drake Lundell
CW Computer Industry Editor

NEW YORK – Realism is stalking the semiconductor memory industry.

The market for semiconductor memories will not reach $1 billion, as projected by some sources, for 1975, but will only be 25% to 50% of that, or $200 million to $500 million, speakers at a Coleman & Co.-sponsored forum said here last week.

At the same time, the group said that the replacement of cores by semiconductors is no longer a question of "if," but solely of when.

To replace cores, the prices of semis will have to come down, they agreed, and most predicted MOS memory circuits priced at .1 cent/bit to 2.5 cent/bit by 1975.

The non-IBM memory market produces about 15 billion bits a year and holds a 15% to 20% growth rate, according to Dr. Gordon Moore, executive vice-president of Intel Corp.

The memory houses will capture $100 million worth of mainframe memory business by 1975, he said, a 10-fold jump over the $10 million worth captured in 1970.

The total market, he said, will double the volume of the mainframe memory market, or $200 million by 1975.

With 30 to 40 firms in the field, Moore said there was worry that significant competition would develop before a significant market.

William R. Arnold, president of Semiconductor Electronic Memories, Inc., said that IBM produced over 50% of the bits shipped last year, for a total of 20 billion bits.

By 1974, he said, the core memory market will have suffered a 50% decline in dollar volume, but no decline in number of bits shipped.

The semiconductor industry, he said, will capture a market of 20 billion bits and will have 50% of the dollar volume in the memory industry on only 36% of the bits by 1974.

If, as had been predicted, the costs get down under .5 cent/bit, he said the semiconductor could attract a larger share of the market in terms of bits, but would remain at around the same dollar volume.

Arnold also predicted that hybrid circuits using bipolar semiconductors to drive and sense MOS units would predominate in the 1970s.

The real threat to the semiconductor houses is that the "seven dwarfs" will integrate vertically, according to Dr. Richard L. Petritz, a director of Mostek Corp. But he predicted that the integration would not happen for several years since the technology is changing so rapidly.

Barry Cash, marketing manager at Mostek, predicted that 1971 would be the year of vendor evaluation. Major factors considered by potential customers, he said, were cost, speed and ease of use.

Next year, according to Cash, will be the year of the prototype, with preproduction runs beginning.

The following year, 1973, will be the year of the complete product, he said, and will be marked by many casualties and drop-outs in the business.

Robert Lloyd, president of Advanced Memory Systems, Inc., disagreed, saying that price erosion would be more than offset by growth over the next few years.

The market, he said, is not tied to CPU shipments for growth because as the price per bit comes down, the amount of memory per CPU will rise.

There will be rapid component obsolescence, he said, so upgrading will have to be made easier by making units compatible at the connector level. For example, he said the 1,024-bit MOS RAM that has become an industry standard will be obsolete within eight months.

The 360 upgrade market, Lloyd said, has hardly been tapped and offers tremendous growth potential.

Firms can compete with IBM in these areas, he said, because IBM has not changed memory prices in over five years. The IBM memory prices now run between 17 cent/bit and 40 cent/bit in the 360 series.

There will be a great number of start-ups as well as a large number of dropouts in the semiconductor industry in the next three to four years, according to Eugene Blanchette, vice-president of Fairchild Camera and Instrument Corp.

Silicon gate with ion implantation will be the major processing technology used to produce MOS RAMs over the same time span, he said.

With modern increases in the processing technology, he said, the industry will be capable of producing a 4,098-bit MOS chip in 1972.

Blanchette said that 1971 would call for a complete reexamination of the technology in the semiconductor memory business. He predicted that bipolar RAMs as large as 1,024 bit/chip will be produced this year and should sell for .3 cent/bit by 1974.

With bipolar units offering speed in the 150 nsec range at that price, he said the differential in cost between MOS and bipolar circuits will then be eliminated.

George Cogar, president of Cogar Corp., said that the price-cutting among the semiconductor houses was going to cause a high mortality rate, "not just in the monolithic memory business."

He noted that IBM was not lowering prices and that in 1975 the industry giant stands to make $15 billion on shipments of 150 billion bits. The competition, on shipments of around 50- billion bits, stands to make only $100 million at the prices they are projecting (i.e. .1 to .2 cent/bit).

Eximbank-Part II

Exporters Offered Plans

By J. Patrick Dugan
Special to Computerworld

In addition to the Export-Import Bank of the U.S. services outlined last week for exporters of computer equipment, the following programs are also available from Eximbank.

The Cooperative Financing Facility involves an arrangement for joint financing of U.S. exports by Eximbank and selected non-U.S. financial institutions and is designed to aid small- and medium-size firms with medium-term credit.

The usual procedure is to require a 10% cash payment by the purchaser, with Eximbank and a private lender sharing the credit on a 50-50 basis, although frequently there is a requirement for some supplier participation in the financing, too.

Eximbank will guarantee the commercial bank's part of the loan if necessary, and may agree to take the later maturities, so that the commercial bank is paid off first.

The preliminary commitment procedure, which applies to all forms of Eximbank financing, enables an exporter, his bank, or a potential overseas customer to obtain, without cost or obligation, a prompt advance commitment.

J. Patrick Dugan is senior vice-president and treasurer-controller of the Export-Import Bank of the U.S.

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ALS, Phase II Also

DoD '72 Budget Includes Wimmix

WASHINGTON, D.C. — The Department of Defense said that the fiscal year '72 DoD budget, which overall contains $842 million above fiscal year '71 for electronics and communications activities (including computers), will have money set aside for Wimmix, ALS and Phase II.

Wimmix, the World Wide Military Command and Control System, shows $1.6 million for R&D from the Defense Communications Agency, $4.5 million for procurement for the Army and $9.4 million budgeted by the Air Force. The latter figure is for operations and maintenance and for rental and contract services.

A total of $1.5 million has been set aside for the Air Force's ALS, Advanced Logistics System, and a total of $24.3 million has been earmarked for the Phase II base level Data Automation Standardization Program.

The Phase II project includes $15.7 million for rental, maintenance and contract services and $8.6 million for purchase of equipment. Phase II is a total $60 million contract awarded to Burroughs several years ago, calling for installation of 127 B3500 computers by mid-1972.

Expansions

Data Products Corp.'s Systems Division has opened two new offices. The Denver branch office is at Continental Terrace Building, Suite 155, 2785 N. Speer Blvd. The Hartford, Conn. branch office is at 119 Ann St.

Data Products Systems Division markets satellite printers, large core memories, large disk memories and remote batch terminals.

Data Processing Security, Inc. has moved its corporate headquarters to 1550 Northwest Highway, Park Ridge, Ill. In addition, the company will open branch offices in Detroit, Dallas, Dayton, Ohio, Washington, D.C., and Los Angeles, as well as regional offices in Chicago, New York and San Francisco.

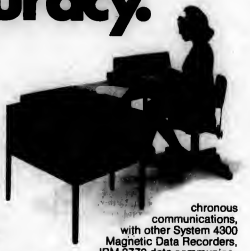
Consolidated Computer International, Inc., a Canadian company with U.S. headquarters in Waltham, Mass., has opened a service facility at 190 Raymond St., Hartford, Conn.

Multiple Access General Computer Corp. Ltd. of Ontario, Canada, has opened a new terminal and service center in Winnipeg, Manitoba.

Digital Scientific Corp., San Diego, Calif., has neared completion of a new, 30,000 sq ft building, adjacent to its corporate headquarters at 11455 Sorrento Valley Road. The building will more than double the company's office, engineering, and manufacturing space.

Singer data entry systems communicate directly with your computer.

In less time. With greater accuracy.



If you're one of those who decided to wait for further developments in key-to-tape technology, congratulations.

Because dozens of companies which upgraded their computer input from key-punching to early key-to-tape systems are upgrading again. This time, to System 4300 Magnetic Data Recording System by Singer.

In fact, over 30% of our System 4300 installations to date have replaced other key-to-tape systems. Companies with experience in key-to-tape appreciate the advances we've made in data communications, pooling and merging speeds, operator efficiency, and system flexibility.

Data communications—in any configuration

System 4300 is completely flexible in both size and configuration.

You can use the data entry/communications units in off-line pooling systems, mixing free-standing recording units with inexpensive keyboard units. Each self-contained recorder can provide program control and recording for up to 64 other recorders or keyboards, depending upon the model you select.

This decentralization of program control completely eliminates the need for expensive multiplexer/controllers to drive the system.

The model 4335 Data Communications Controller permits 4300-to-4300 (tape-to-tape) communications, tape-to-printer, or tape-to-tape and printer operations, as well as remote 4300 two-way communication with a large-scale computer.

System 4300 has direct compatibility, via binary synchronous communications, with other System 4300 Magnetic Data Recorders, IBM 2770 data communications systems, IBM System 360/Mod 25 to 85 and System Ten business computers by Singer.

The ability to mix data densities—200, 556, 800 and 1600 bpi—within a single system. Merging may be accomplished from any combination of densities and 7- or 9-track code structures to any other combination of these factors by off-line pooling, or on-line data communications.

Choose the system easiest of all to use

All System 4300 recording units display the column number, data en-

Bills Would Assist Jobless With Civilian R&D Projects

WASHINGTON, D.C. – Similar bills have been introduced in both houses of Congress to enlist the aid of the National Science Foundation and other government units in putting unemployed technical people back to work on civilian socially oriented research and development projects.

The House Bill, H.R. 34, was reintroduced in this session of Congress and has 68 cosponsors. A similar version, called S. 32 in the Senate, was introduced by Sen. Edward Kennedy (D-Mass.) with 14 cosponsors. The House bill was referred to the Committee on Space and Astronautics and the Senate version to the Committee on Labor and Public Welfare.

Essentially, both pieces of legislation are aimed at converting current R&D activities from a defense to a civilian posture. They would be aimed at helping solve domestic problems in such areas as health, transportation, housing, crime and pollution.

At a press conference Rep. Robert N. Giaimo (D-Conn.) and Rep. John W. Davis (D-Ga.), in discussing the House bill, charged that surging unemployment within the ranks of America's scientists, engineers and technicians is "nothing short of a national disgrace."

H.R. 34 "will not alone create millions of new jobs," Giaimo cautioned, "or solve our domestic problems. It will create, however, an atmosphere for change, a climate for conversion to new tasks and goals."

Highlights of the House bill include:

- Authorization of $450 million over a three-year period for specific programs of education, research and assistance to small business firms in order to aid in the conversion from defense to civilian R&D.
- NSF sponsorship of research on conversion and development and administration of retraining programs for technical people.
- Department of Commerce sponsorship through the Economic Development Administration, of conversion retraining programs for management personnel presently involved in defense-related R&D.
- Small Business Administration assistance of small business firms in achieving conversion by providing technical grants, loan guarantees and interest assistance payments.
- NSF grants to state and local governments to establish conversion planning and support programs at the state, local and regional levels.
- NSF grants to local governments and non-profit corporations for the establishment and development of Community Conversion Corporations.

tered, and program function in plain English.

Controls have been vastly simplified. And System 4300 handles virtually every function with fewer operator steps. For instance, the operator can locate and correct a record in just seven steps, instead of the 17 to 24 steps required with other systems.

System 4300 provides variable 200-character record length as standard on all encoders. There's no need to fill a "fixed" length of empty columns.

The 4300's program lets the operator record any length record – from one to 200 characters – and immediately begin a new record.

Choose from any of these additional options

System 4300 offers many options simply not available yet on other data entry systems.

Redundant Digit Checking

Many different modules are offered. Any two may be selected for use in a particular system.

Line Printer

A high-speed line printer can be used with the 4300 Magnetic Data Recording System to provide fast data communications print-out (on-line), or as an off-line magnetic tape document printer.

Printing Totalizer

A Totalizer keeps two running totals of up to 13 columns each for program selected fields. The proven Friden* Totalizer gives you a printed record at a speed of 47 characters per second.

Ask about other features

Program Intercept, Spacebar Program Scan, File Explosion, Station/Operator Identification, Other Computer Manufacturers' Compatibility.

There's no reason to hesitate. System 4300 is the system you have been waiting for. For full information, call your nearest Friden Office. Or write: Friden Division, The Singer Company, San Leandro, California 94577.

System 4300 Key-to-Tape by SINGER

CRT Display From LSI Features Choice of Character Capacity

ANAHEIM, Calif. -- The Model 7700 CRT display terminal from the Electronic Instrumentation Division of Lear Siegler, Inc. (LSI) is available in two versions with either 1,000 characters (40 char/line) or 2,000 characters (80 char/line). Both have 25 lines.

The Model 7700 incorporates an array of editing features and four different transmit modes. Options offered include a 96-character set, blinking characters, and complexed interfaces. The standard 7700 interface is compatible with EIA Standard RS232, the company said. The terminal is interfaced for asynchronous operation with the 103 or 202 data sets. Synchronous operation is available as an option.

Optional configurations permit serial transmission up to 120,000 bit/sec or parallel transfer rates of 15,750 char/sec.

Both versions of the Model 7700 interactive display terminal are available for under $3,000 each from LSI at 714 N. Brookhurst St.

Sems 8 Memory From EM Designed for Severe Environments

HAWTHORNE, Calif. -- Electronic Memories' severe environments memory, the Sems 8, is a nonvolatile, DRO ferrite core memory system organized with standard 3-wire, 3D configuration with standard capacities of 4,096 words of up to 32 bits, and 8,192 words of up to 16 bits.

The Sems 8 has an access time of 450 nsec and a cycle time of 1.2 µsec. It operates at read/restore and clear/write modes in operating temperatures of -55°C to +85°C (base mounting surface); non-operating at -62°C to +125°C. The unit satisfies applicable portions of Mil-E-5400; Mil-E-16400 (Mil-S-901), Mil-E-4158, Mil-Q-9858 and Mil-Std-883 requirements, according to the firm at 12621 Chadron Ave.

Remex Reveals 75 char/sec Model RPS-1075 Paper Tape Punch

HAWTHORNE, Calif. -- The Remex Model RPS-1075 paper tape punch operates at 75 char/sec, and offers backspace capabilities; reels up to 8-1/2 in. in diameter; and TTL compatible modular electronics.

The unit punches paper and mylar, 5-, 6-, 7- and 8-track tapes, and typesetter versions also available. The RPS-1075 is priced at $1,690 each in small quantities, and quantity OEM discounts are available from the firm at 5250 El Segundo Blvd.

New OEM Products

Bryant Reveals Mini Controller

WALLED LAKE, Mich. -- Bryant Computer Products' Series 720 controller is compatible with a variety of minicomputers.

The series allows the user to expand his storage requirements from 0.6 million bits to over 70 million bits, depending on which of eight different Bryant storage memory systems are used.

As many as eight data storage devices with electronics interface may be directly connected with up to two processor channels by using various configurations of the Series 720.

Any mix or match of Bryants' positioning or fixed-head devices can be used; the two data channels can be identical processors, or can be of two different types of processors.

Lear Siegler 7700 CRT

Sems-8 From EM

Remex Paper Tape Punch

Computer Mate's Tape Transports Available in 1, 2, or 3 Units

SAN CLEMENTE, Calif. -- The Computer Mate CM-101 single unit, CM-102 two unit and CM-103 three unit cassette transports utilize a direct drive system for eliminating the need for a capstan and pinch roller.

Standard tape speed is 10 in./sec, start/stop time is less than 40 msec, start/stop distance is under 0.40 in. and packing density is 800 bit/in. Other features include 2-track recording (one per cassette side), an EOT/BOT sensing scheme, and internal character-by-character parity check.

The CM-100 series is priced at $800 by Computer Mate, Inc., 150 Calle de Los Molinos.

DuMont CRT Has Multiple Screens

CLIFTON, N.J. -- A dual-area, phosphor cathode-ray tube having multiple screens has been developed by the DuMont Electron Tubes Division of Fairchild Camera and Instrument Corp.

Designated the K1887P1/P22RM, the display area consists of a P-1 screen 2-1/4 in. in diameter, centered in a circular P22R screen whose diameter is 1/2 in. larger. The tube is aluminized.

The unit is a 3 in. diameter electrostatic focus, magnetically deflected CRT, but the screen type can be applied to many other bulbs. As many as five screen types can be applied to one CRT, the company said. Copies of the screen and tube specifications can be obtained from 750 Bloomfield Ave.

Litronix Has Numeric Display

CUPERTINO, Calif. -- A solid-state light-emitting diode (LED) numeric display with 6/10 in. character height is available from Litronix, Inc. Data-Lit 6 is a seven segment display that has two bars per segment and utilizes gallium arsenide phosphide technology.

The Data-Lit 6 has a low forward voltage drop of 3.4 V and a luminance of 500 foot-lamberts at 20 mA. The device is compatible with 5 V IC logic supplies, according to the company.

Quantity prices for the unit range from $24.75 for up to nine units, to $19 for over 100 units from the firm at 19000 Homestead Rd.

Dialight Features Diode-lite

BROOKLYN, N.Y. -- Dialight Corp. has developed the Diode-lite, made with gallium arsenide phosphide.

The maximum ratings for the device are forward dc current of 50 mA; reverse voltage of 3 V; power dissipation derated 1.3 mW/°C above 25°C of 100 mW; and storage temperature of 100°C.

The operating temperature is from -40°C to 100°C; relative humidity at 65°C is 98%. High brightness for the device is 1,500 ft lamberts at 20 mA. The Diode-lites are priced at $1.55 for 1 to 9 units discounted to $.69 in quantities of 1,000 to 2,499 from the firm at 60 Stewart Ave.

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Nickels and Dimes

For those of you with a passing interest in the big defense contractors as well as in the computer industry, a major cause of General Dynamic's $25.7 million fourth quarter loss was the Stromberg-Datagraphix subsidiary. The COM unit turned in a $12 million deficit, twice as large as 1969's, for the year, while GD lost $6.5 million. Another big loser was the Tactical Missile Division, which dropped $15.9 million for the year.

$$$

Systems Associates of Long Beach, Calif., has reached the letter of intent stage in its acquisition talks with Computer Graphics of Wichita, Ken. Computer Graphics is the owner of the first software patent, the Bernhart-Fetter planar representation program, which it intends to market if it becomes a division of SSA.

$$$

Remember the little companies that had fantastic percentage growth in incomes and revenues? Well there are still some left. Systems Associates, for example. Six-month revenues jumped 65%, from $1.1 million to $1.8 million for the period ended Dec. 31, and net increased astronomically, to $85,246 from $3,334. So now the company is getting into acquisition.

'IBM on Defensive'

Calcomp Head Sees Bright '71 Projections

ANAHEIM, Calif. – Preliminary estimates by the company say that California Computer Products first-half results will better last year's by a factor of four.

Calcomp President Lester L. Kilpatrick told a meeting of the New York Society of Security Analysts that earnings for the half ended Jan. 3 were about four times the $231,883, or 10 cents a share, earned last year.

Sales were about double the $10.4 million of last year, he revealed.

For the year ending June 30, Kilpatrick predicted that earnings would rise to more than $1 a share, and that sales would rise to between $40 million and $50 million.

In the last full fiscal year, Calcomp earned $807,000, or 35 cents a share, on sales of $27.5 million.

The bulk of Kilpatrick's remarks to the analysts concerned the threat of increased IBM competition in the peripheral market, particularly the disk drive market.

Financial

A Calcomp subsidiary, Century Data Systems, makes IBM-compatible disk units.

Kilpatrick said that IBM's recent marketing moves did not threaten to eliminate independent competition. He said that "IBM will tolerate penetration by independents up to about 20% of the [disk drive] market, which currently is roughly $200 million per year in lease revenue."

Room for Both

The executive said there is room enough for IBM and the independents in a market that size.

He also noted that the Calcomp price cuts forced by the 2319 introduction won't materially affect Calcomp's profits because of more efficient and increased production.

"Regardless of IBM strategy, Calcomp will continue to claim a modest – but for us significant – share of the disk drive market," he said.

He noted that "IBM, not the independents, is on the defensive. For the first time in its history IBM has been forced to lower prices in order to retain its predominant share of the market. . .IBM deserves its seat on the pinnacle, but the rest of us can prosper, too."

According to Kilpatrick's estimates, by the end of 1970 IBM had lost about 8% of the disk drive market to its competitors.

He revealed that orders for Calcomp's disk units increased slightly in the month following IBM's 2319 announcement.

Boothe Fourth Quarter Earnings Rise 36%

SAN FRANCISCO – Boothe Computer Corp. has reported earnings for the fourth quarter, 1970, up 36% over comparable 1969 earnings.

Net income for the fourth quarter was $781,000, or 42 cents a share, up from $572,000, or 31 cents a share in 1969. Fully diluted earnings were 39 cents for the fourth quarter, 1970, and 29 cents a share for 1969.

Year-end earnings reached an all-time high for 1970. Earnings for the year ended Dec. 31, 1970 were $2.8 million or $1.50 a share, up from $2.5 million or $1.37 a share in 1969. Fully diluted earnings were $1.42 a share in 1970 and $1.29 in 1969.

Revenues for the year 1970 were $46 million and for the fourth quarter $13.9 million. 1969 revenues were $42.3 million for the year and $11.3 million for the fourth quarter. Earnings and revenue data for these periods have been adjusted to include the effect of a 10% stock dividend and an acquisition.

"The increased earnings," company Chairman D.P. Boothe said, "resulted from the fully leased position of the computer portfolio which more than offset increased interest costs during most of 1970, and the heavy startup costs of subsidiaries acquired during the year."

In October 1970, the company acquired GAC Computer Leasing Corp.'s portfolio which added $50 million additional 360 computers to U.S. and Canadian operations.

"We anticipate continued profitable operations for 1971," Boothe continued.

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Model 240 (self-contained) Data Terminal

GENERAL DESCRIPTION:
An all purpose data terminal to eliminate time delays, reduce data introduction error and greatly speed up the transfer of information.

MODE OF OPERATION:

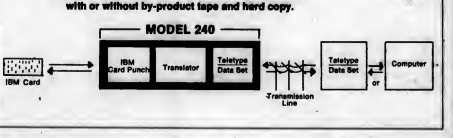
A. Will receive teletype messages in 4 modes
1. Paper tape
2. Hard copy
3. Punched cards
4. All three at the same time

B. Will transmit punched cards to a teletype where it can be received as copy or tape or will access to almost any computer as a time sharing terminal.

C. Off line
1. Will convert cards to tape
2. Will convert tape to cards
3. As a keypunch
4. Printer for payroll applications, inventory control etc.

ADAPTABILITY: If you already own a keypunch or teletype, we will supply the other units to provide you with the complete system at a lower cost.

CARD TO LINE/LINE TO CARD OPERATION
with or without by-product tape and hard copy.



AVAILABILITY: IMMEDIATE, contact: Mr. John Fennell, Mr. Vincent Littlefield.

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SEL First-Half Earnings, Revenues Drop

FT. LAUDERDALE, Fla. — The first half was disappointing at Systems Engineering Laboratories. Consolidated earnings for the period, ended Dec. 25, plummeted to $38,724, or two cents a share, from $615,724, or 27 cents a share, last year.

Revenues fell from $9.2 million to $8 million.

SEL President S.P. Eghash said that earnings were hurt by a continued slowdown in capital equipment spending during the first half that was especially critical in peripheral sales. Both of the corporation's peripheral equipment subsidiaries reported operating losses during the period.

He added that in spite of the spending slowdown the company's traditional computer operations continued to operate at a profit during the first half mitigating the losses incurred by subsidiaries.

SEL develops, manufactures and markets real-time digital computers, related data acquisition and control equipment, computer peripherals and computer-based keyboard data entry systems.

New Registrations

COMPUTER MICROTECHNOLOGY, INC., 610 Pastoria Ave., Sunnyvale, Calif., a company engaged in the manufacture and marketing of integrated circuit memory components and other related integrated circuit components, has filed to register 205,100 shares of common stock at $6 per share maximum.

CYBERNATICS INC., 2460 Lemoine Ave., Fort Lee, N.J., a company specializing in on-line computer systems, including data and message communication systems, has filed to register 250,000 shares of common stock. Proceeds, at $8.30 per share maximum, intended for use in continued development and completion of an economical generalized computer communications system employing low-cost computers, and the balance for company's working capital. The underwriter is Halle & Stieglitz, Inc., 92 Wall St., New York 10009.

VOLT INFORMATION SCIENCES, INC., 640 W. 40th St., New York, N.Y. 10018, a company engaged in providing the aerospace, electronics, defense and other industries with engineering, technical and computer services, and in creating sales and marketing programs for consumer goods vendors and developing and administering training programs for government and community agencies, has filed to register 50,000 outstanding shares of Class A convertible preferred stock and 2,469,379 outstanding shares of common stock.

Acquisitions

Metridata Computing, Inc., Louisville, Ky., has acquired a portion of the time-sharing business of Applied Computer Time-Share, Inc. (Acts), a Lear-Siegler, Inc. subsidiary. The acquisition includes customer accounts formerly served by Acts in southern Indiana, southern Ohio, and Kentucky. The agreement provides for the acquisition of certain software packages from Acts.

Photon, Inc., Wilmington, Mass., a producer of phototypesetting equipment, has acquired the assets of Bridge Data Products, Inc., Philadelphia, Pa. Bridge developed and produces computer peripheral equipment.

Faim Information Services, Inc., an information management and corporate communications company, has acquired Consult, Inc., a management and DP consulting firm, for an undisclosed amount of cash. Consult will be operated as a subsidiary of Faim and will assume responsibility for Faim's DP consulting practice in the northeast.

Adage Inc., Boston, Mass., has acquired Computer Displays, Inc., Waltham, Mass., a manufacturer of graphics terminals.

Speedkeeping Systems, Inc., Mountain Lakes, N.J., has acquired International Computer Services, Inc. (CS), a firm offering computerized services to accountants. ICS will be operated as a wholly owned subsidiary of Speedkeeping.

WORLD COMPUTER LEASING CORPORATION
We invite you to contact us regarding your Computer or Unit Record Equipment Requirements.
Sales – Leasing – Purchase of Equipment
Contact Vernon Stillwell or Pat Whitmarsh
1346 Motor Court • AC 214-742-1841 • Dallas, Texas 75207

WORKSHOP ON PROTECTION AND INSURANCE OF COMPUTERS

A one-day workshop on the protection and insurance of computers is being considered by the publishers of *Computerworld* and *Business Insurance*, a leading publication in the insurance industry.

The workshop would cover the important safety, security, and insurance considerations that play a part in risk-free computer operations. It would serve the interests of risk managers of corporations that use computers as well as insurance carriers, brokers, and agents that employ computers to process insurance policies and claims.

This shirtsleeve workshop would include lecturers, panelists, and moderators carefully selected from the nation's foremost authorities on computer risk management, loss prevention, and insurance.

This one-day workshop, in Chicago, would inform you of the latest techniques in the protection of computer equipment and the storage of computer data.

Registration fee for the full day's program (including breakfast, luncheon, coffee breaks, and a workshop notebook) would be approximately $90, with reduced rates for multiple attendees from the same company.

If you are interested, please use the coupon on this page and mail it in by March 3.

Send to: Computer Workshop, Business Insurance, 740 N. Rush St., Chicago, Illinois 60611

☐ Yes, I would certainly make every effort to attend your proposed Computer Protection/Insurance Workshop. Please send me full details if you go ahead with it.

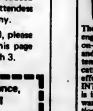
CW

Name_____ Title_____

Company_____

Address_____

City_____ State_____ Zip_____



INTERACTIVE GRAPHICS FOR COMPUTER-AIDED DESIGN
by M. David Prince, *Lockheed-Georgia Company*
This book is concerned with one of today's major emerging technologies: man-computer graphics for computer-aided design (CAD). The author covers the principles of CAD, showing how it lets the engineer test a hypothesis quickly, see its effects and modify the result in a multiple-pass optimization process—thus permitting a superior design within budget and time constraints. The book discusses the application of CAD principles to design engineering, analysis, and manufacturing. The basic concepts of on-line graphical interaction with the computer are explained and the features suitable for display consoles and computer systems evaluated. This book also deals with the selection of applications amenable to CAD solution and factors affecting cost effectiveness.
INTERACTIVE GRAPHICS FOR COMPUTER-AIDED DESIGN is intended to serve as a guide for the practicing engineer who wants to use CAD in his work. It also provides a valuable orientation for programmers to the use of interactive graphics.
301 pp, 237 illus (1971) $13.95

10-Day Free Examination
Addison-Wesley Publishing Company
Reading, Massachusetts 01867
☐ INTERACTIVE GRAPHICS FOR COMPUTER-AIDED DESIGN, Prince (0975) $13.95
I understand I can return the book in 10 days and pay nothing if I decide not to keep it.
Name_____
Company_____
Address_____
City_____ State_____ Zip_____

HOW do things look for the computer industry as the pause in growth apparently is ending?
The current "Gray Sheet" -- a Midyear Review -- examines the status of each major mainframe supplier and all industry segments. Send for the current issue -- $8. Or, go ahead. A year's supply only costs $75.
EDP industry report
Department N-20
60 Austin Street
Newtonville, Mass. 02160
617-969-4020

Computerworld Stock Trading Summary

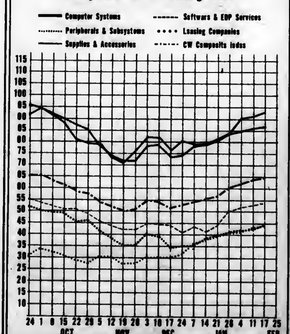
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02138

CLOSING PRICES WEDNESDAY, FEBRUARY 17, 1971

EXCH		PRICE 1970-71 RANGE (1)	CLOSE FEB 17 1971	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 10	3	+ 1/4	+9.0
A	APPLIED DATA RES.	4- 24	10 1/4	+2 1/4	+28.1
O	APPLIED LOGIC	1- 18	1 5/8	+ 1/8	+6.3
O	ARIES	1- 8	1 7/8	0	0.0
N	AUTOMATIC DATA PROC	23- 49	49 3/8	+1 1/8	+2.3
O	AUTO SCIENCES	3- 14	6 1/4	+2 3/8	+40.4
O	BRANDON APPLIED SYS	1- 10	7/8	- 1/8	-12.5
O	COMPUTER AGE INDUS.	1- 3	3/4	0	0.0
O	COMPUTER ENVIRON	1- 15	1 3/8	+ 1/8	+10.0
O	COMPUTER INDUS.	2- 24	3	0	0.0
O	COMPUTER NETWORK	2- 14	3 1/2	+ 3/4	+15.7
O	COMPUTER PROPERTY	4- 15	7 1/2	- 1/4	-3.2
N	COMPUTER SCIENCES	6- 34	12 7/8	+1 1/2	+13.1
O	COMPUTER TASK GROUP	1- 4	1	0	0.0
O	COMPUTER USAGE	2- 8	8 3/4	+ 1/4	+3.6
O	COMP AUTOMOT REPORTS	3- 11	8 1/2	0	0.0
A	COMPUTING & SOFTWARE	16- 75	34 3/8	+ 3/8	+1.0
O	COMRESS	1- 10	2 1/8	+ 3/8	+21.4
O	COMSHARE	2- 15	3	+ 1/8	+2.5
O	CONSOL. ANAL. CENT.	1- 4	1 3/8	0	0.0
O	DATA AUTOMATION	1- 24	1 1/2	+ 1/8	+9.0
O	DATA PACKAGING	5- 29	8 3/4	- 3/8	-8.8
O	DATAMATION SERVICE	1- 6	1 1/2	- 1/4	-14.2
O	DATATAB	4- 9	8 3/4	- 3/4	-10.0
O	DIGITEK	1- 3	2 1/4	0	0.0
O	EDP RESOURCES	5- 13	9 3/8	+ 7/8	+10.0
A	ELECT COMP PROD	3- 11	5	0	0.0
O	ELECTRONIC DATA SYS.	31-161	74 1/2	-2	-2.6
O	INFORMATICS	4- 21	9 7/8	+ 1/8	+1.2
A	ITEL	6- 26	18 1/2	- 1/4	-1.3
A	MANAGEMENT DATA	7- 23	9 3/4	-1	-9.3
O	NATIONAL CSS INC	4- 16	8 1/4	+ 1/4	+3.1
O	NAT COMP ANALYSTS	1- 6	1 1/2	- 1/8	-7.6
O	NAT.COMP. SERV.	2- 12	3	-6	-66.8
N	PLANNING RESEARCH	13- 54	22 3/4	- 1/8	-0.5
O	PROGRAMMING METHODS	9- 27	26 1/2	+2 1/2	+10.4
O	PROGRAMMING & SYS	2- 5	3 1/2	0	0.0
L	PROGRAMMING SCIENCES	1- 33	2 1/8	+ 1/8	+6.2
N	SCIENTIFIC RESOURCES	2- 22	*4 3/8	0	0.0
O	SOFTWARE SYSTEMS	1- 3	1/2	- 1/8	-20.0
O	TBS COMPUTER CENTERS	4- 27	6	- 1/4	-4.0
O	TOLLEY INTL CORP	1- 13	4 1/2	- 3/8	-7.8
O	UNITED DATA CENTER	1- 5	3 3/4	-1	-21.0
N	UNIVERSITY COMPUTING	14- 99	23	-2 5/8	-9.5
A	URS SYSTEMS	5- 21	10 3/8	0	0.0
O	U.S. TIME SHARING	1- 14	1 7/8	- 1/8	-6.2
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	20- 62	31	- 7/8	-2.7
O	ALPHANUMERIC	2- 13	5 1/8	+1	+24.2
N	AMPEX CORP	13- 46	20 1/2	- 1/8	-0.6
O	ASTRODATA	1- 34	1 3/8	+ 1/8	+10.0
O	ATLANTIC TECHNOLOGY	2- 14	4 7/8	- 1/8	-2.3
A	BOLT,BERANEK & NEW	3- 11	7 1/4	+ 1/4	+3.5
N	BUNKER-RAMO	6- 14	11 7/8	- 3/4	-5.9
A	CALCOMP	11- 38	27 5/8	+1 1/2	+5.7
O	COGNITRONICS	3- 13	8 1/8	- 1/4	-2.9
O	COLORADO INSTRUMENTS	4- 12	7 1/2	+ 5/8	+9.0
O	COMPUTER COMMUN.	3- 36	12 3/4	+2 7/8	+29.1
A	COMPUTER EQUIPMENT	4- 12	5 7/8	+ 1/8	+2.1
A	COMPUTEST	12- 26	18 3/8	- 1/8	-0.6
O	CONSOL COMPUTER LTD.	4- 14	10 1/2	+ 1/4	+2.4
A	DATA PRODUCTS CORP	3- 26	8	- 3/8	-4.4
O	DATA TECHNOLOGY	2- 23	8 7/8	- 1/2	-6.7
O	DIGITRONICS	3- 13	7 7/8	+1 5/8	+26.0
N	ELECTRONIC M & M	7- 40	10 3/8	- 5/8	-5.3
O	FABRI-TEK	2- 8	2 7/8	- 1/8	-4.1
O	FARRINGTON MFG	1- 17	1 3/8	0	0.0
O	FOTO-MEM INC	2- 39	2 1/2	-1 1/4	-33.3
O	INFOREX INC	16- 38	33 1/4	- 3/4	-2.2
O	INFORMATION DISPLAYS	4- 20	8 3/8	- 1/4	-3.7
O	KEYDATA CORP	7- 14	12 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 4	1 1/4	0	0.0
A	MARSHALL INDUSTRIES	14- 87	22 1/4	- 1/4	-1.1
A	MILGO ELECTRONICS	15- 42	20 3/8	-1	-4.8
N	MOHAWK DATA SCI	19- 67	30 1/4	+ 1/2	+1.6
O	ON LINE SYSTEMS INC	6- 23	11	0	0.0
O	OPTICAL SCANNING	11- 52	16	+2	+12.5
O	PHOTON	4- 17	9 1/4	- 1/8	-1.3
O	PHOTO-MAGNETIC SYS.	1- 6	1 1/2	+ 5/8	+71.4
A	POTTER INSTRUMENT	15- 42	21 1/8	+ 3/8	+1.6
O	PRECISION INST.	8- 23	11	-1 1/2	-12.0
O	RECOGNITION EQUIP	12- 83	21 1/8	+3 1/8	+17.3
O	REDCOR CORP.	4- 34	7 1/4	0	0.0
N	SANDERS ASSOCIATES	7- 29	17 7/8	+ 3/8	+2.1
O	SCAN DATA	5- 33	8 3/4	0	0.0
O	TALLY CORP.	10- 23	13 3/4	- 3/8	-2.8
N	TELEX	10- 25	18 1/2	- 1/2	-2.9
O	VIATRON	1- 31	2 1/2	+ 1/4	+11.1
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	8- 19	18 7/8	+ 1/4	+1.3
O	BALTIMORE BUS FORMS	6- 21	10 1/4	+1 1/8	+12.3
A	BARRY WRIGHT	8- 25	12	+ 1/8	+1.0
A	DATA DOCUMENTS	15- 33	27	+2 3/8	+9.8
N	ENNIS BUS. FORMS	9- 19	12 3/4	- 1/8	-0.9
O	GRAHAM MAGNETICS	4- 18	13 7/8	-1 3/8	-9.9
O	GRAPHIC CONTROLS	5- 17	8 5/8	+ 1/8	+1.4
N	MEMOREX	48-188	37 1/4	- 7/8	-1.5
N	3M COMPANY	71-114	103 7/8	+1 3/8	+1.3
O	MOORE BUS. FORMS	25- 39	38 3/8	- 3/8	-0.9
N	NASHUA CORP	21- 43	37	+1	+2.7
O	REYNOLDS & REYNOLD	25- 46	41 3/4	+ 1/2	+1.2
O	STANDARD REGISTER	17- 30	21 1/8	+ 1/8	+0.3
O	TAB PRODUCTS CO	4- 12	11 5/8	+ 1/8	+1.0
N	UARCO	22- 39	27 1/4	- 7/8	-3.1
A	WABASH MAGNETICS	7- 30	10 1/4	+ 1/2	+5.1
N	WALLACE BUS FORMS	17- 41	20 1/2	- 3/4	-3.5
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	78-173	123 1/8	-2 1/8	-1.8
N	COLLINS RADIO	9- 37	16	+ 1/8	+0.8
N	CONTROL DATA CORP	30-122	61	+ 1/4	+0.4
O	DATA GENERAL CORP	16- 39	28 3/8	- 3/4	-2.7
N	DIGITAL EQUIPMENT	50-124	71	+3 1/4	+4.7
N	ELECTRONIC ASSOC.	3- 11	7 1/4	+ 1/8	+1.7
A	ELECTRONIC ENGINEER.	3- 14	7 3/4	0	0.0
!	FOXBORO	16- 39	32 3/8	- 1/4	-0.7
O	GENERAL AUTOMATION	9- 42	13 3/4	- 1/2	-3.0
N	GENERAL ELECTRIC	60-107	104	- 1/2	-0.4
N	HEWLETT-PACKARD CO	19- 45	36 5/8	+ 3/8	+1.0
N	HONEYWELL INC	63-152	102 1/2	+3	+5.1
N	IBM	223-387	338 1/2	-2 1/4	-0.6
O	INTERDATA INC	3- 22	7 7/8	- 1/8	-1.3
N	NCR	30- 86	40 3/8	- 3/8	-1.3
N	RCA	18- 34	32 3/4	- 1/8	-0.3
N	RAYTHEON CO	16- 37	38 3/8	+1	+2.6
O	SCI. CONTROL CORP.	1- 6	2	+ 1/8	+6.6
N	SPERRY RAND	19- 40	31 5/8	- 5/8	-1.9
A	SYSTEMS ENG. LABS	10- 49	15 1/8	0	0.0
N	VARIAN ASSOCIATES	9- 29	17 3/4	+ 3/4	+4.4
N	WANG LABS.	16- 31	34 3/8	- 1/4	-0.7
N	XEROX CORP	66-113	94 3/8	-1 1/4	-1.3
	LEASING COMPANIES				
O	BOOTHE COMPUTER	6- 25	17 7/8	- 7/8	-4.8
O	BRESNAHAN COMP.	2- 9	3 7/8	+ 1/8	+3.3
O	COMPUTER EXCHANGE	2- 8	8 3/8	+1 3/8	+19.6
A	COMPUTER INVSTRS GRP	4- 12	10 1/2	+1	+10.3
N	DATA PROC. F & G	8- 32	14	- 1/8	-0.8
O	DATRONIC RENTAL	2- 8	3 3/4	- 1/4	-6.2
A	DEARBORN COMPUTER	10- 30	29 1/8	+ 5/8	+2.1
O	DIEBOLD COMP. LEAS.	2- 6	7	+ 1/4	+3.7
A	DPA, INC.	3- 10	9 1/4	+ 1/2	+6.8
A	GRANITE MGT	7- 22	12 3/8	- 1/4	-2.0
A	GREYHOUND COMPUTER	5- 44	9 3/8	+ 3/8	+4.1
N	LEASCO DATA PROC.	7- 30	20 3/8	+1 3/8	+7.2
O	LECTRO MGT INC	1- 9	2 1/2	- 1/4	-9.0
A	LEVIN-TOWNSEND CMP	3- 19	9	0	0.0
O	LMC DATA, INC.	1- 4	1	- 1/8	-11.1
O	NCC INDUSTRIES	3- 8	3	0	0.0
O	SYSTEMS CAPITAL	1- 6	5 3/8	+ 3/8	+7.3
N	U.S. LEASING	3- 20	18 3/8	+ 1/8	+0.6

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR
* PRICE 2/2/71

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

COMPUTER USAGE CO.
Three Months Ended Dec. 31

	1970	1969
Shr Ernd	$.01	.....
Revenue	1,039,392	$1,866,711
Earnings (Loss)	10,389	(488,406)

MOORE PRODUCTS CO.
Year Ended Dec. 31

	1970	1969
Shr Ernd	$.87	$.60
Revenue	13,281,100	13,031,646
Earnings	1,254,347	1,112,397

INFOTRONICS CORP.
Nine Months Ended Dec. 31

	1970	a1969
Revenue	$4,560,693	$4,580,939
Loss	b708,129	307,838

a-Restated by company. b-Includes charge of $212,419 from write-down of inventories and accounts receivable.

GREYHOUND COMPUTER CORP.
Year Ended Dec. 31

	1970	1969
Shr Ernd	$.78	$1.09
Revenue	49,176,000	48,665,000
Earnings	3,281,000	4,566,000
3 Mo Shr	.18	.20
Revenue	12,016,000	12,829,000
Earnings	778,000	801,000

DIEBOLD COMPUTER LEASING
Year Ended Dec. 31

	1970	1969
Shr Ernd	$.48	$.35
Revenue	33,465,000	30,947,000
Earnings	1,902,000	1,441,000
3 Mo Shr	.15	.06
Revenue	8,780,000	8,083,000
Earnings	574,000	225,000

MILGO ELECTRONIC CORP.
Three Months Ended Dec. 31

	1970	1969
Shr Ernd	.....	a$.21
Revenue	$1,977,643	2,889,944
Spec Cred	.....	333,000
Earnings (Loss)	(83,598)	b654,583

a-Based on income before special credit and adjusted to reflect a two-for-one stock split in April 1970. b-Equal to 42 cents a share.

POTTER INSTRUMENT CO.
Three Months Ended Dec. 31

	1970	a1969
Shr Ernd	$.29	$.14
Revenue	7,773,000	6,550,000
Earnings	762,000	390,000
6 Mo Shr	.42	.38
Revenue	14,323,000	16,946,000
Earnings	1,152,000	848,000

a-Restated to reflect accounting change.

DATA-CONTROL SYSTEMS
Three Months Ended Jan. 1

	1971	1970
Revenue	$1,070,000	$1,629,000
Loss	46,000	46,000

SYSTEMS ENGINEERING LABS
26 Weeks Ended Dec. 25

	1970	a1969
Shr Ernd	$.02	$.27
Revenue	8,044,120	8,159,220
Earnings	38,732	815,724

a-Restated for change in accounting periods.

ELECTRONIC ASSOCIATES
Year Ended Jan. 1

	1971	1970
Revenue	$30,960,000	$41,224,000
Spec Chg	a3,996,000	.....
Loss	8,995,000	2,222,000
3 Mo Shr	.03	.....
Revenue	8,232,000	13,801,000
Earnings (Loss)	78,000	(1,682,000)

a-Consists of a charge of $3.8 million from accounting change and $155,000 from discontinued operations.

DASA CORP.
Year Ended Oct. 31

Shr Ernd	.....	$.73
Revenue	$16,752,302	10,599,240
Cont Op (Loss)	(3,347,000)	1,651,212
Loss Disc Op	106,000	.....
Spec Chg	a18,796,000	.....
Earnings (Loss)	(23,248,000)	a1,651,212

a-Consists of $17.7 million in write-downs from the merger of Cyber-Tronics, Inc., into Dasa on Dec. 18, 1969, and $2.05 million in write-offs of investments in discontinued product lines.

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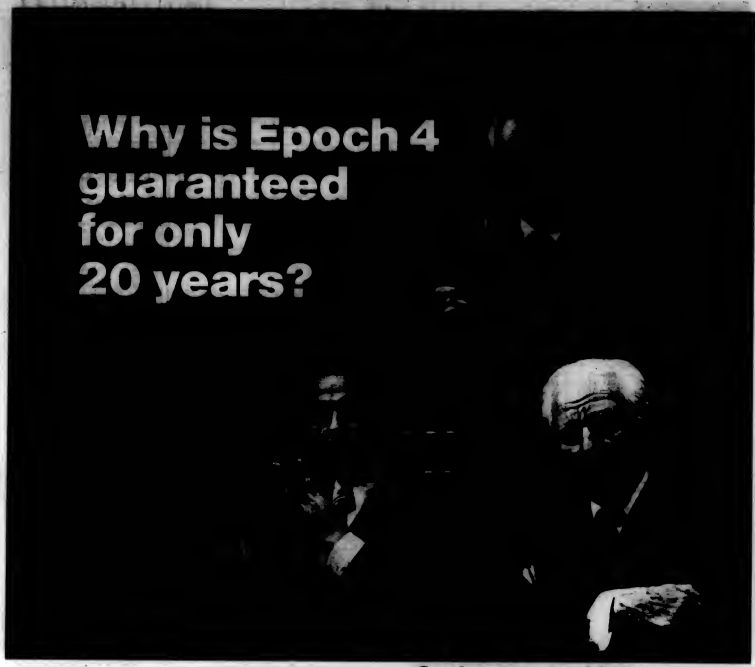
A BOSTON COMPUTER GROUP company

Why is Epoch 4 guaranteed for only 20 years?



Our lawyers wouldn't let us say "forever."

We figure a 20-year warranty will make our point, even if we can't legally say "forever." *Epoch 4's new coating is so tough, so flexible and resilient, that it withstands the kind of handling that would instantly kill a conventional computer tape.*

Put another way, Epoch 4's new coating is 8000% tougher than the best competitive products on the market.

We're serious about the 20-year warranty. Because we're serious about Epoch 4's fantastic performance.

Isn't it time you got serious about eliminating dropouts? Isn't it time you got serious about Epoch 4?

EPOCH 4

permanent magnetic tape

GRAHAM MAGNETICS INCORPORATED

Graham, Texas 76046 WATS Phone 800-433-2701 Texas Phone 817-549-3211